FINAL

THERMAL TREATMENT TECHNOLOGY CONCEPTUAL DESIGN COST ESTIMATE

McCormick and Baxter Superfund Site Stockton, California

Volume 1 of 2

November 12, 2001

Prepared for

EPA
REGION 9

U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, California 94105-3901

Prepared by

U.S. Army Corps of Engineers
Seattle District
4735 East Marginal Way South
Seattle, Washington 98134

URS

1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
53F0074206.02

CONTENTS

ABBREVIATIONS AND ACRONYMS vii

1.0 INTRODUCTION 1-1
1.1 PURPOSE 1-2
1.2 APPROACH 1-2
1.3 ORGANIZATION 1-3

2.0 BACKGROUND 2-1
2.1 DESCRIPTION OF ALTERNATIVES 2-1
2.1.1 Thermal Treatment Scenario 1—Main Processing Area (MPA), Cellon Process Area (CPA), and North-MPA 2-1
2.1.2 Thermal Treatment Scenario 2—MPA, CPA, North-MPA, South-MPA, and South-CPA 2-2
2.1.3 Thermal Treatment Scenario 3—MPA, CPA, North-MPA, South-MPA, South-CPA, East–MPA, and Oily Waste Ponds Area (OWPA) ... 2-3
2.1.4 Pump-and-Treat System 2-3
2.2 COST ESTIMATE ORGANIZATION 2-4
2.2.1 Cost Estimate Summary 2-5
2.2.2 Cost Worksheets 2-6
2.3 GENERAL COST ASSUMPTIONS 2-7

3.0 REMEDIAL ACTION COST EVALUATIONS 3-1
3.1 THERMAL TREATMENT SCENARIO 1—MPA, CPA, AND NORTH-MPA 3-1
3.1.1 Capital Costs 3-1
3.1.2 Operation and Maintenance Costs 3-3
3.1.3 Periodic Costs 3-6
3.2 THERMAL TREATMENT SCENARIO 2—MPA, CPA, NORTH-MPA, SOUTH-MPA, AND SOUTH-CPA 3-7
3.2.1 Capital Costs 3-7
3.2.2 Operation and Maintenance Costs 3-8
3.2.3 Periodic Costs 3-8
3.3 THERMAL TREATMENT SCENARIO 3—MPA, CPA, NORTH-MPA, SOUTH-MPA, SOUTH-CPA, EAST-MPA, AND OWPA 3-9
3.3.1 Capital Costs 3-9
3.3.2 Operation and Maintenance Costs 3-10
3.3.3 Periodic Costs 3-11

CONTENTS (Continued)

3.4 PUMP-AND-TREAT SYSTEM 3-11
3.4.1 Capital Costs 3-12
3.4.2 Operation and Maintenance Costs 3-13
3.4.3 Periodic Costs 3-16

4.0 LIFE CYCLE COST AND PRESENT VALUE ANALYSIS 4-1
4.1 THERMAL TREATMENT COSTS 4-1
4.1.1 Capital Costs 4-1
4.1.2 O&M Costs 4-1
4.1.3 Periodic Costs 4-2
4.1.4 Life Cycle Cost and Present Value 4-2
4.2 GROUNDWATER PUMP-AND-TREAT COSTS 4-2
4.2.1 Capital Costs 4-2
4.2.2 O&M Costs 4-3
4.2.3 Periodic Costs 4-4
4.2.4 Life Cycle Cost and Present Value 4-4
4.3 COST COMPARISONS FOR THERMAL AND PUMP-AND-TREAT SYSTEMS 4-4
4.3.1 Capital Cost 4-4
4.3.2 O&M Costs 4-4
4.3.3 Periodic Costs 4-5
4.3.4 Life Cycle Cost and Present Value 4-5
4.3.5 Unit Costs 4-6

5.0 SENSITIVITY ANALYSIS 5-1
5.1 DURATION OF TREATMENT 5-1
5.2 TREATED GROUNDWATER DISPOSAL METHOD 5-1
5.3 ENERGY COSTS 5-3
5.4 PATENT FEES 5-4
5.5 PHASING OF DESIGN, CONSTRUCTION, AND O&M ACTIVITIES 5-5

6.0 CONCLUSIONS 6-1

7.0 REFERENCES 7-1

CONTENTS (Continued)

APPENDICES

A Thermal Treatment Scenario 1—MPA, CPA, and North-MPA
B Thermal Treatment Scenario 2—MPA, CPA, N-MPA, South-MPA, and South-CPA
C Thermal Treatment Scenario 3—MPA, CPA, North-MPA, South-MPA, South-CPA, and East-MPA
D Pump-and-Treat System
E Thermal Treatment Scenario 1—Thermal Treatment by Area
F Thermal Treatment Scenario 1—Thermal Treatment by Depth Zone

FIGURES

1-1 General Location Map 1-4
1-2 Detail of Site, Showing Historical Usage 1-5
1-3 South-to-North Section, Based on USACE Data 1-6
1-4 West-to-East Section, Based on USACE Data 1-7
2-1 Site Map of Main Impact Areas 2-10
2-2 Thermal Treatment Process Diagram 2-11
5-1 Scenario 1—Thermal Treatment by Area (MPA and CPA) 5-9
5-2 Scenario 1—Thermal Treatment Phased by Depth Zone 5-13

TABLES

2-1 Key Design Assumptions 2-12
2-2 Labor Markup Assumptions 2-17
3-1 Thermal Treatment Scenarios—Performance and Compliance Monitoring 3-18
3-2 Groundwater Pump-and-Treat Performance and Compliance Monitoring 3-23
4-1 Life Cycle Costs and Present Value 4-7
5-1 Sensitivity Analyses 5-16
5-2 Cost Comparison of Thermal Treatment by Area (MPA and CPA) and Phased by Depth Zone, Scenario 1 5-21

ABBREVIATIONS AND ACRONYMS

BTU	British thermal unit
CPA	Cellon Process Action
DTS	distributed temperature sensing
EPA, USEPA	U.S. Environmental Protection Agency
ERH	electrical resistance heating
ERT	electrical resistance tomography
GAC	granular activated carbon
kW-hour	kilowatt-hour
MCASES	Micro-Computer Aided Cost Estimating System
MPA	Main Processing Area
NAPL	nonaqueous-phase liquid
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
OWPA	Oily Waste Ponds Area
SteamTech	SteamTech Environmental Services, Inc.
TRS	Thermal Remediation Services, Inc.
URS	URS Corporation
USACE	U.S. Corps of Engineers
USDOE	U.S. Department of Energy
WBS	work breakdown structure

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 9, with assistance from the U.S. Army Corps of Engineers (USACE), Seattle District, is evaluating the potential costs of thermal and pump-and-treat remedial actions to clean up soil and groundwater contamination at the McCormick and Baxter Superfund Site (McCormick and Baxter), located in Stockton, California. This 32-acre site is a former wood-treating facility located in a predominantly industrial area near the Port of Stockton, at the junction of Interstate 5 and State Highway 4 (Figure 1-1). Figure 1-2 shows historic process areas and structures within the site where contamination by creosote, pentachlorophenol, metals (arsenic, copper, chromium, and zinc), and various solvents or carriers such as kerosene and diesel, butane, and ether have affected soil and groundwater to significant depths in multiple aquifers. Figures 1-3 and 1-4 show the general subsurface soil conditions and five aquifers identified by USACE during prior investigations of the McCormick and Baxter site.

The order-of-magnitude cost estimates presented in this document have been developed by URS Corporation (URS), with assistance from SteamTech Environmental Services, Inc. (SteamTech) and Thermal Remediation Services (TRS). This evaluation has been performed in accordance with the February 9, 2001, scope of services for Contract No. DACA67-98-D-1005, Delivery Order No. 65, for Tasks 3, 4, and 5. This document also reflects guidance provided by EPA, USACE, and a technical advisory panel during design development meetings for Task 2. The cost estimates developed for these thermal and pump-and-treat remedial actions are a key factor in EPA's decision-making process for the McCormick and Baxter site.

The remedial actions evaluated in this document include three alternatives (Scenarios 1, 2, and 3) for a thermal treatment system being assessed by EPA and USACE as a promising technology for accelerating remediation of the McCormick and Baxter site. These thermal treatment scenarios are described in a companion document, *Thermal Treatment Technology Conceptual Design, McCormick and Baxter Superfund Site, Stockton, California*, prepared by SteamTech, with assistance from TRS and URS (USEPA 2001a). The groundwater pump-and-treat system is described in the soils and groundwater feasibility study report prepared for EPA by ICF Kaiser Engineers, Inc. (USEPA 1998). The estimated costs of implementing the pump-and-treat system have been updated in this cost estimate report, including the cost impacts of 30 and 100 years of system operation and maintenance, for comparison with the thermal treatment scenarios.

1.1 PURPOSE

EPA, Region 9, with assistance from the USACE, Seattle District, is evaluating alternatives to the selected remedy that may accelerate cleanup of the McCormick and Baxter site. The scope of services for Delivery Order No. 65 includes the development of 10 percent conceptual designs by SteamTech and TRS for three thermal treatment alternatives (Scenarios 1, 2, and 3), with concurrent development of cost estimates by URS. In addition, URS has prepared an independent cost evaluation for the groundwater pump-and-treat system alternative that was previously selected for remediation of the McCormick and Baxter site (USEPA 1999). The pump-and-treat system's costs are based on 30 and 100 years of operation and maintenance.

1.2 APPROACH

The cost evaluations prepared by URS are in general accordance with EPA's guidance document, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USEPA 2000a). Key elements of that estimating procedure have been incorporated into our evaluation, including the structuring of cost elements to account for capital costs, annual operation and maintenance (O&M) costs, periodic costs, and construction contingencies. Our evaluation also includes present value analyses and sensitivity analyses to evaluate the impact of changes in key parameters and assumptions on the estimated costs.

The McCormick and Baxter cost evaluations are based on a 10 percent level of design. In accordance with EPA guidance (USEPA 2000a), the estimates prepared by URS are considered order-of-magnitude estimates that are expected to be within –30 to +50 percent of the actual costs of the completed projects. Use, interpretation, and decision-making should therefore reflect this level of uncertainty regarding the cost evaluations.

URS has used Costlink© version 1.6c (Building Systems Design, Inc.), a commercial estimating software package, to develop the detailed "bottom up" cost estimates for the three thermal treatment scenarios and the groundwater pump-and-treat system. This software package is a commercial version of the Micro-Computer Aided Cost Estimating System (MCASES) used by USACE and is compatible with Microsoft Windows-compatible versions of the MCASES software. Work breakdown structure (WBS) numbers are used to provide a standardized format and organization through each level of the estimate. Where possible, commercial and government databases have been used for construction labor and commodity-type equipment and supplies, which should allow convenient revision and updating of the estimates by USACE and its contractors in later phases of the project. The cost estimate summaries for each evaluation are presented in Excel97, with cost information imported from the Costlink© worksheets.

1.3 ORGANIZATION

This document consists of the following sections:

- Background—This section provides a brief description of each alternative, how the cost estimate information is organized and presented in the document, and general cost assumptions and data sources used for the estimates.

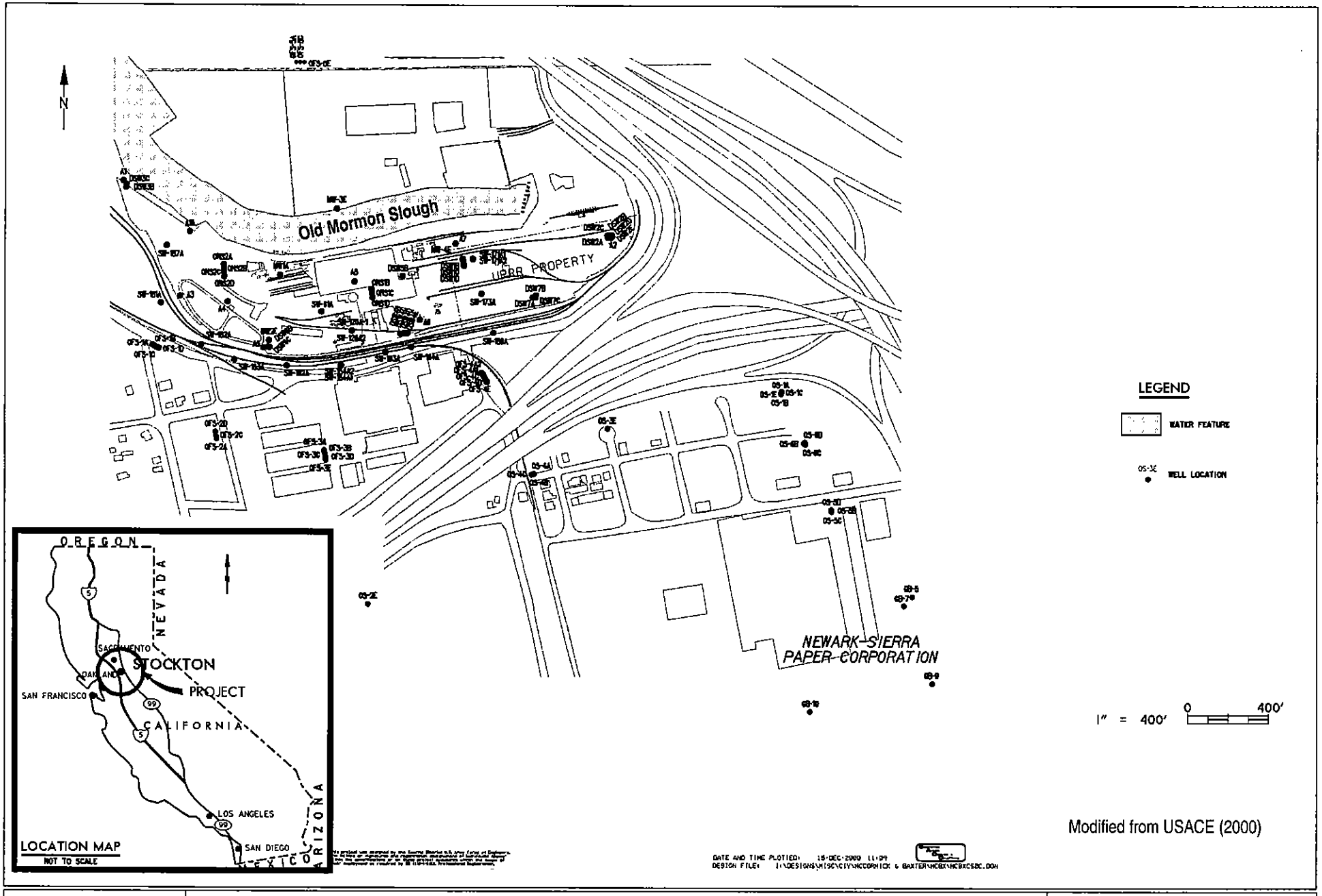
- Remedial Action Cost Evaluations—This section describes the major cost elements and assumptions regarding the capital, annual O&M, and periodic costs for the three thermal treatment scenarios and the groundwater pump-and-treat remedy.

- Life Cycle Cost and Present Value Analysis—The total cost of each remedy over the life span of the project is estimated and compared with its present value.

- Sensitivity Analysis—This section briefly discusses the impact of changes in key input values or time-dependent activities upon the remedy costs.

- Conclusions—This section summarizes the results of the cost evaluations.

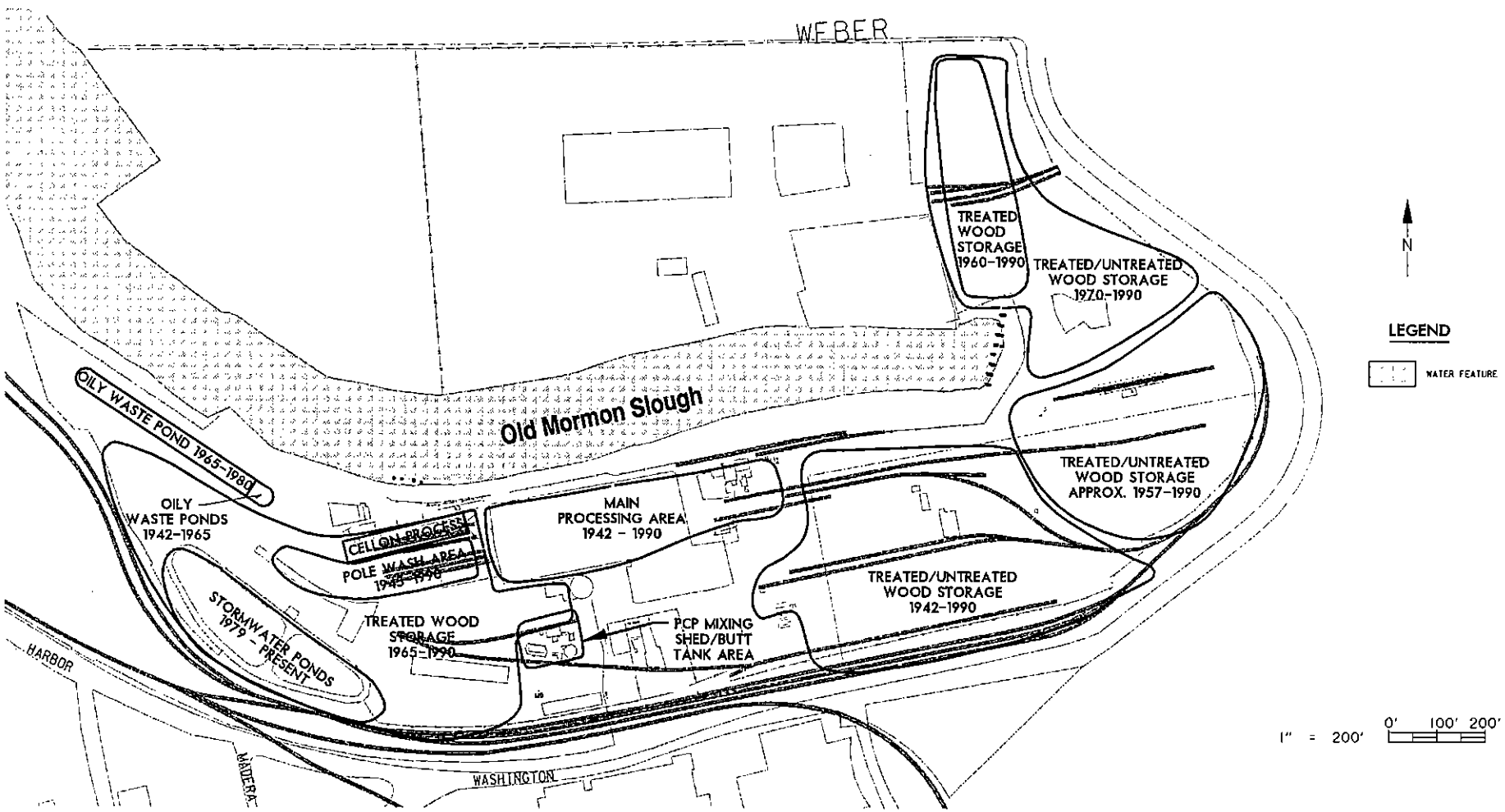
- References



Modified from USACE (2000)

Figure 1-1
General Location Map

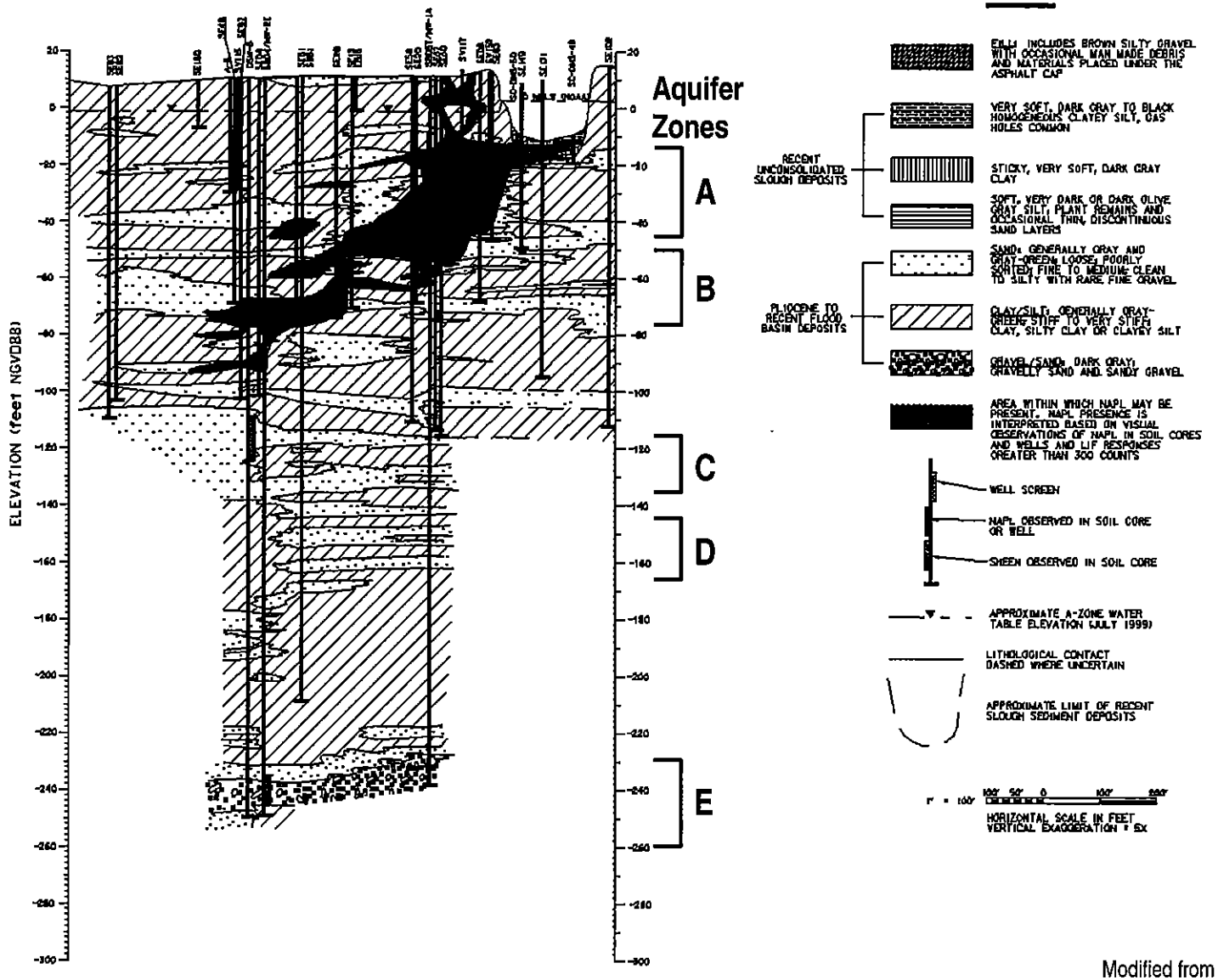
THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California



Modified from USACE (2000)

Figure 1-2
Detail of Site, Showing Historical Usage

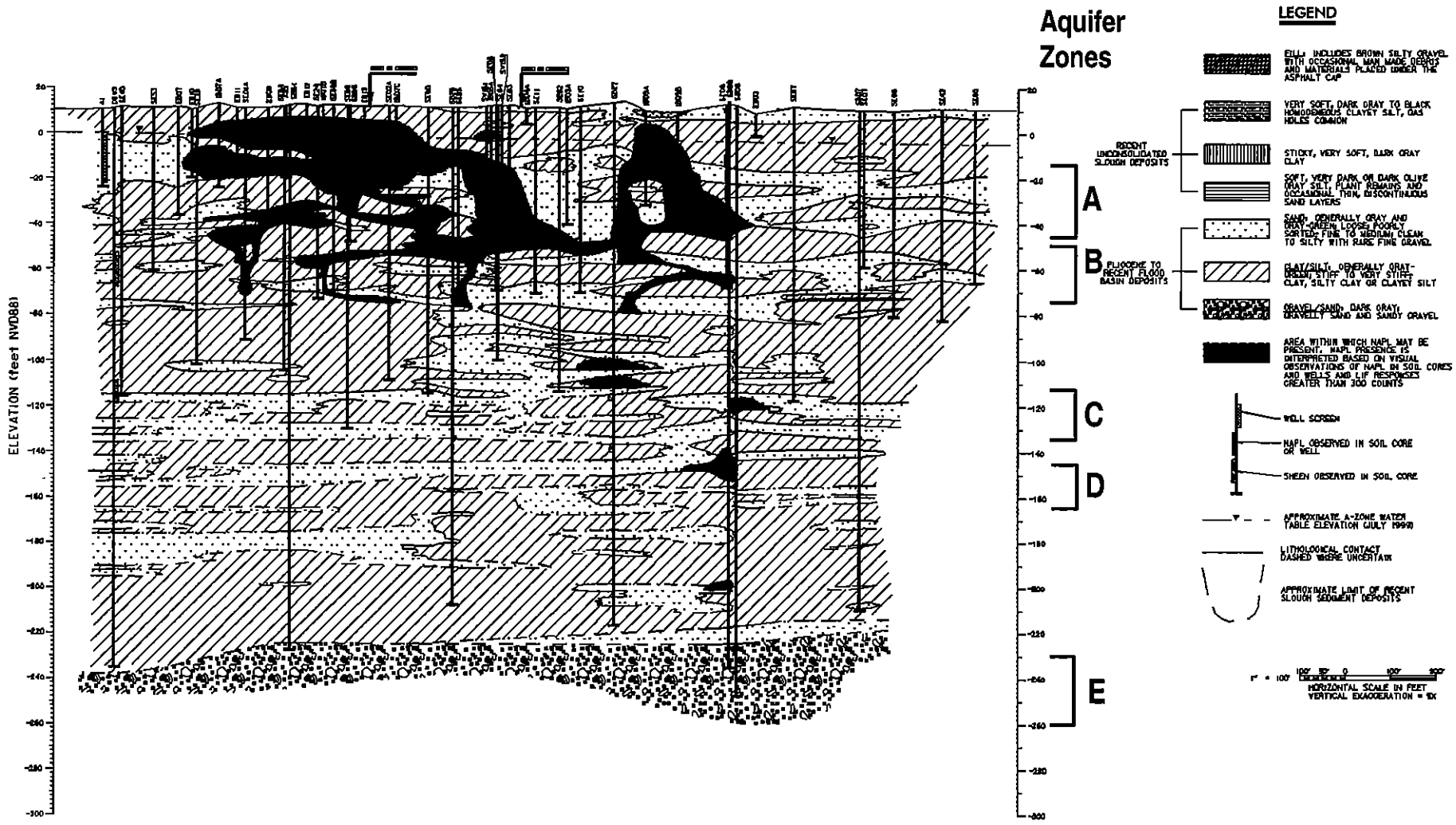
THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California



Modified from USACE (2000)

Figure 1-3
South-to-North Section, Based on USACE Data

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California



Modified from USACE (2000)

Figure 1-4
West-to-East Section, Based on USACE Data

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

2.0 BACKGROUND

2.1 DESCRIPTION OF ALTERNATIVES

Detailed descriptions of the thermal treatment scenarios and major assumptions regarding implementation are discussed in the conceptual design report (USEPA 2001a) for the McCormick and Baxter site. Figure 2-1 shows the main impact areas delineated in the McCormick and Baxter site. Table 2-1 provides a summary of key design assumptions reflected in the URS-prepared estimates. A brief description of the three thermal treatment scenarios that were evaluated follows.

2.1.1 Thermal Treatment Scenario 1—Main Processing Area (MPA), Cellon Process Area (CPA), and North-MPA

The MPA and CPA are the major historical sources of the nonaqueous-phase liquids (NAPLs) that have contaminated soil and groundwater within the McCormick and Baxter site. Subsurface migration from the MPA and CPA has also impacted the deep subsurface zones under the slough (North-MPA). SteamTech has estimated that up to 1.54 million cubic yards of NAPL-impacted soil is present in the area delineated for this scenario, representing 52 percent of the total volume of NAPL-impacted soil believed present at the McCormick and Baxter site (USEPA 2001a). The thermal remedy includes the following components (also see Figure 2-2):

- Steam injection will be used for subsurface thermal treatment to heat contaminated subsurface soil and groundwater zones to increase contaminant mobility and promote in situ destruction of contaminants by hydrous pyrolysis oxidation. The steam system includes on-site steam boilers, water supplies (recirculated process water, freshwater), water softeners, electrical steam turbines (cogeneration of electricity), and a fuel (natural gas) supply system. On-site electrical cogeneration from the steam boilers will be used for focused treatment of low-permeability soil zones and to operate process equipment for vapor, water, and NAPL recovery and treatment.

- Low-permeability subsurface soil will be treated by electrical resistance heating (ERH), including external power sources and internal sources (cogeneration during steam production), power control systems, and electrical distribution systems.

- Steam injection wells and ERH electrodes will be used to target subsurface soil and groundwater contamination in five subsurface treatment zones.

- Vapor and NAPL/groundwater recovery from extraction wells within the five subsurface treatment zones will be used to physically remove contaminants and provide hydraulic and pneumatic control of contaminant migration pathways.

- Liquid-phase treatment in an on-site treatment plant, using physical processes (separators, induced air flotation, multi-media filters) and chemical processes (adsorption by liquid-phase granular activated carbon), will be provided to meet water quality criteria for reinjection into the deepest subsurface treatment zones (Zone E). Treated water will be used for on-site steam generation during thermal treatment, supplemented by freshwater sources. Limited quantities of waste liquids, including water softener brine, will be discharged off site via a publicly operated treatment works.

- Vapor-phase treatment will be performed on site using the steam boiler systems and vapor-phase granular activated carbon.

- Recovered NAPL, waste solids, and spent treatment and processing media (filters, granular activated carbon) will be treated or disposed of at permitted off-site disposal facilities.

- Short- and long-term monitoring programs for performance and compliance, as well as confirmation of post-treatment site conditions, and institutional controls for the 30-year life of the project are included in the treatment scenario.

2.1.2 Thermal Treatment Scenario 2—MPA, CPA, North-MPA, South-MPA, and South-CPA

This scenario includes the areas designated for Scenario 1 (MPA, CPA, North-MPA), and is expanded to the south (South-MPA and South-CPA). SteamTech has estimated that up to 2.10 million cubic yards of NAPL-impacted soil is present in the area delineated for this scenario, representing 71 percent of the total volume of NAPL-impacted soil believed present in the McCormick and Baxter site (USEPA 2001a). The treatment processes are the same as indicated for Scenario 1. Steam injection, NAPL/groundwater extraction and treatment, power demand for ERH, and equipment sizes increase due to the larger volume of soil and groundwater to be treated.

2.1.3 Thermal Treatment Scenario 3—MPA, CPA, North-MPA, South-MPA, South-CPA, East–MPA, and Oily Waste Ponds Area (OWPA)

This scenario includes the areas designated for Scenario 2, and extends to the east (East-MPA) and west to the OWPA. The scenario includes known and suspected areas of NAPL-impact documented for the McCormick and Baxter site. SteamTech has estimated that up to 2.95 million cubic yards of NAPL-impacted soil is present in the area delineated for this scenario, representing 100 percent of the total volume of NAPL-impacted soil believed present in the McCormick and Baxter site (USEPA 2001a). The treatment processes are the same as indicated for Scenarios 1 and 2. Steam injection, NAPL/groundwater extraction and treatment, power demand for ERH, and equipment sizes increase due to the larger volume of soil and groundwater to be treated.

2.1.4 Pump-and-Treat System

The groundwater pump-and-treat remedy, including major assumptions regarding implementation, is described in EPA's soils and groundwater feasibility study report and the Record of Decision (USEPA 1998; USEPA 1999). URS performed an independent evaluation of the feasibility study's preferred alternative (referred to as Groundwater Treatment Alternative GW-4—Hydraulic Containment and NAPL Removal), the system components described in these documents, and the 1998 cost estimate developed by ICF Kaiser Engineers (USEPA 1998). In addition to updating the estimated cost for the groundwater pump-and-treat remedy, the period of operation was expanded from 30 years to 100 years. Table 2-1 provides a summary of key design assumptions reflected in the URS-prepared estimates.

The groundwater pump-and-treat system is intended to contain and hydraulically control groundwater contamination within the McCormick and Baxter site, preventing off-site horizontal migration of contaminants and further degradation of the deeper aquifer zones. The pump-and-treat remedy includes the following:

- Groundwater extraction from wells within the five subsurface treatment zones is used to hydraulically control contaminant migration from the site (43 wells, cumulative extraction of 235 gallons per minute or 123.5 million gallons per year).

- NAPL extraction from wells in areas of known accumulation, specifically the MPA and CPA, is used to remove free-phase contaminants from the groundwater (10 wells, cumulative extraction of 100,000 gallons over 100 years).

- Liquid-phase treatment of recovered NAPL and groundwater is performed in an on-site treatment plant. The plant includes physical treatment units (oil/water separator, filters), a biological treatment unit (fixed-film bioreactor), and a chemical treatment unit (liquid-phase granular activated carbon). Water quality objectives for an off-site surface water discharge (Old Mormon Slough) are assumed equivalent to the requirements of a National Pollution Discharge Elimination System (NPDES) permit.

- Recovered NAPL, waste solids, and spent treatment and processing media (filters, granular activated carbon) will be treated or disposed of at permitted off-site disposal facilities.

- Short- and long-term monitoring programs for performance and compliance, as well as confirmation of post-treatment site conditions, and institutional controls for the 30-year operating life of the project are included in the treatment scenario.

The 30-year and 100-year pump-and-treat systems are assumed to have the same objectives, methods, and execution requirements. The pump-and-treat systems will be identical in terms of treatment type and capacity; capital construction costs are therefore the same for the 30-year and 100-year comparisons. The cost estimates for 30 years of operation and maintenance will allow comparison to the ICF Kaiser (USEPA 1998) estimate and the three thermal treatment scenarios, which are evaluated for 30 years of operation and monitoring.

EPA has also requested an evaluation of the costs of 100 years of operation and maintenance for the pump-and-treat system. The cleanup time estimated for the pump-and-treat system is significantly longer than the 100-year scenario, with cleanup times for different aquifer zones ranging from hundreds to thousands of years (USEPA 1998). The 100-year benchmark has been established to allow a comparison of cumulative costs for the three thermal treatment scenarios to the costs of a pump-and-treat system as part of the feasibility study to select a final groundwater remedy.

2.2 COST ESTIMATE ORGANIZATION

The cost estimates for each remedy are presented in two formats: cost estimate summaries and cost worksheets. A brief discussion of each cost presentation format is provided below. The URS-prepared estimates are provided as appendixes to this document, with key information or assumptions noted in this document for each remedy.

2.2.1 Cost Estimate Summary

The cost estimate summary includes the total resource costs over time for each remedy, generally referred to as the life cycle cost. The life cycle cost includes design, construction, operation and maintenance, and closeout activities. The continuing capital costs for repair or replacement (periodic costs) are also accounted for in the life cycle cost. The main elements of each cost estimate summary are as follow:

- Capital costs—These are the expenditures required to construct the remedial systems for each remedy. These costs include labor, equipment, materials, subcontractors, and other direct costs (utilities, per diem, travel, etc.), as well as overhead and profit, scope contingencies, and bid contingencies.

- Operation and maintenance (O&M) costs—These are the short-term and long-term O&M costs to implement a remedy and subsequent performance, compliance, confirmation (post-treatment effectiveness), and long-term monitoring. These costs include labor, equipment, materials, subcontractors, and other direct costs (electricity/natural gas, waste management, per diem, travel, etc.), as well as overhead and profit, scope contingencies, and bid contingencies. In addition, the O&M costs vary with the operational stage of the project. For example, the cost of active thermal treatment by ERH and steam injection is significantly higher than the cost for post-treatment monitoring activities. As such, the annual O&M cost will be accounted for in increments of 1 to 5 years to reflect their change over the project life.

- Periodic costs—Periodic costs are capital or O&M costs that occur only once every few years (well redevelopment, equipment repair/replacement, granular activated carbon (GAC) vessel replacement and disposal) or only once during the entire project (final demolition of treatment facilities and wells). Because of their periodic nature, these costs are accounted for separately in the cost summary.

- Present Value Analysis—Present value analysis is a method for evaluating expenditures, either capital or O&M, which occur over different time periods. The present value is the dollar amount that needs to be set aside at the beginning of the project (base year) to assure that funds are available in the future, as they are needed. For each remedy, the period of analysis is defined (30 years for the three thermal scenarios, 30 and 100 years for the groundwater pump-and-treat system) and the cash outflow (annual O&M cost) has been estimated for each year of the project. In accordance with EPA's OSWER Directive No. 9355.3-20 (June

1993), EPA policy is to use a discount rate of 7 percent to calculate the present value for cleanups performed by EPA using the Superfund trust fund for non-Federal facilities.

The cost summaries also provide total costs for the entire time period of the remedy (the life cycle cost), which can be compared between remedies and with the present value analyses.

In accordance with EPA guidance (USEPA 2000a), the life cycle cost evaluations do not include costs incurred prior to design, such as investigation and study costs. These evaluations also exclude government or program management costs, including EPA and USACE oversight and management.

2.2.2 Cost Worksheets

The cost worksheets consist of customized reports created using the Costlink© software. These reports contain a table of contents, summarized costs that are used in the cost estimate summaries described in Section 2.2.1, and detailed estimates for each major capital or O&M cost item identified for a remedy.

The summary reports created by Costlink© include three levels of increasing detail (account, system, and subsystem), which provide a general overview of cost allocation. These reports include direct costs (documented in the detailed estimates described below), general and administrative costs (commonly referred to as overhead), contractor profit, bonding, and contingency costs. The summary report for each remedy is the source of capital and annual O&M costs shown in the cost estimate summary.

The detailed estimate portions of the Costlink© reports document URS' assumptions regarding labor, equipment, materials, subcontractors, and other direct costs for major cost items. URS has identified each major capital or O&M cost item of a specific remedy (organized by WBS number) and created a detailed estimate within the Costlink© report. Each cost worksheet (detailed estimate) has a brief work statement regarding what is included in the specific capital or O&M cost item, as well as any cost adjustments included in the estimate. Labor, equipment, materials, subcontractors, and other direct costs (electricity/natural gas, waste management, per diem, travel, etc.) are allocated to individual cost items. In addition, units of measure, assumed quantities and brief descriptive notes are included in each line item within the worksheet. Where available, vendor quotes, telephone records, and product information are enclosed with each cost worksheet to document the source and basis of costs used in the estimate. Other costs are based on construction databases or past experience of URS, TRS, and SteamTech personnel. Backup

information regarding crew composition, labor, and equipment rates is also provided with the cost worksheets.

Scope and bid contingency factors are allocated to each major cost item in the Costlink© summary report and defined in the settings pages enclosed with each Costlink© report. As defined by EPA (USEPA 2000a), scope contingency represents project risk associated with an incomplete design, reflecting costs that are unforeseeable during preparation of this estimate. Bid contingency (also known as construction contingency) represents project risk associated with changes that occur after a construction contract is awarded. Values used by URS for individual items vary based on the perceived risk for the specific activity. The values used and a brief description of the basis for selection are noted in the settings information provided for the individual Costlink© reports.

2.3 GENERAL COST ASSUMPTIONS

The following general cost assumptions were used to develop the cost estimates for the McCormick and Baxter remedies:

- Capital, O&M, and periodic costs for each remedy are based on midyear 2001 costs; future costs are estimated using 2001 costs, with no escalation for inflation.

- Sources for labor and equipment productivity and crew makeup for common general construction activities are based on the NAT95 Unit Price Book (compatible with Costlink©/MCACES software systems) published by USACE.

- Labor rates for craft labor and staff labor are based on midyear 2001 rates.

- Staff labor rates (managers, scientists, engineers, technicians and clerical) are based on pay grades for various professional and technical capabilities as widely used in other URS estimates.

- Craft labor rates are from Davis-Bacon General Decision Number CA000029, dated October 27, 2000, and its rates for the Stockton area, escalated by 3.0 percent to establish midyear 2001 rates.

- Statutory taxes and insurance, benefits and fringes, and overhead allocation rates are derived from typical contractor experience rates reported in RS Means

publications and other sources. The assumed markups for labor used in URS' estimates are indicated in Table 2-2.

- Sales tax has not been applied to materials or rental equipment, assuming that the federal government will be exempt from this levies.

- Cost sources for labor, equipment, and materials for installation of specialized treatment equipment are derived from manufacturer/vendor quotes and the experience of SteamTech and TRS personnel.

- Cost sources for furnishing and installing injection/extraction wells are based on budgetary quotes from qualified well drilling contractors.

- Cost sources for utility availability, capacity, and unit costs for construction and operation of the remedial systems are based on information obtained from local utilities (electricity, gas, water, and sanitary sewer) and the experience of SteamTech and TRS personnel.

- Electricity costs are assumed to be $0.06 per kilowatt-hour (kW-hour), based on energy statistics published by the U.S. Department of Energy, Energy Information Administration (www.eia.doe.gov). Recent energy price fluctuations in the State of California were assumed to not be representative of long-term electrical rates. Cogeneration of electricity during active steam generation and subsurface injection is expected to significantly reduce or eliminate off-site electrical costs related to the targeted use of ERH to treat low-permeability soil zones and operation of the treatment systems during years 1 through 4. After completion of the active thermal treatment period, off-site electrical sources will be used for the comparatively lower power demand for ongoing vapor and NAPL/groundwater treatment and disposal. The potential impacts of energy cost fluctuations are discussed in Section 5, Sensitivity Analysis.

- Natural gas costs are assumed to be $3.50 per million BTUs, based on energy statistics published by the U.S. Department of Energy, Energy Information Administration (www.eia.doe.gov), specifically EIA's *Annual Energy Lookout 2001–Forecast Comparisons* (USDOE 2000). Recent energy price fluctuations in the State of California were assumed to not be representative of long-term natural gas rates. The potential impacts of energy cost fluctuations are discussed in Section 5, Sensitivity Analysis.

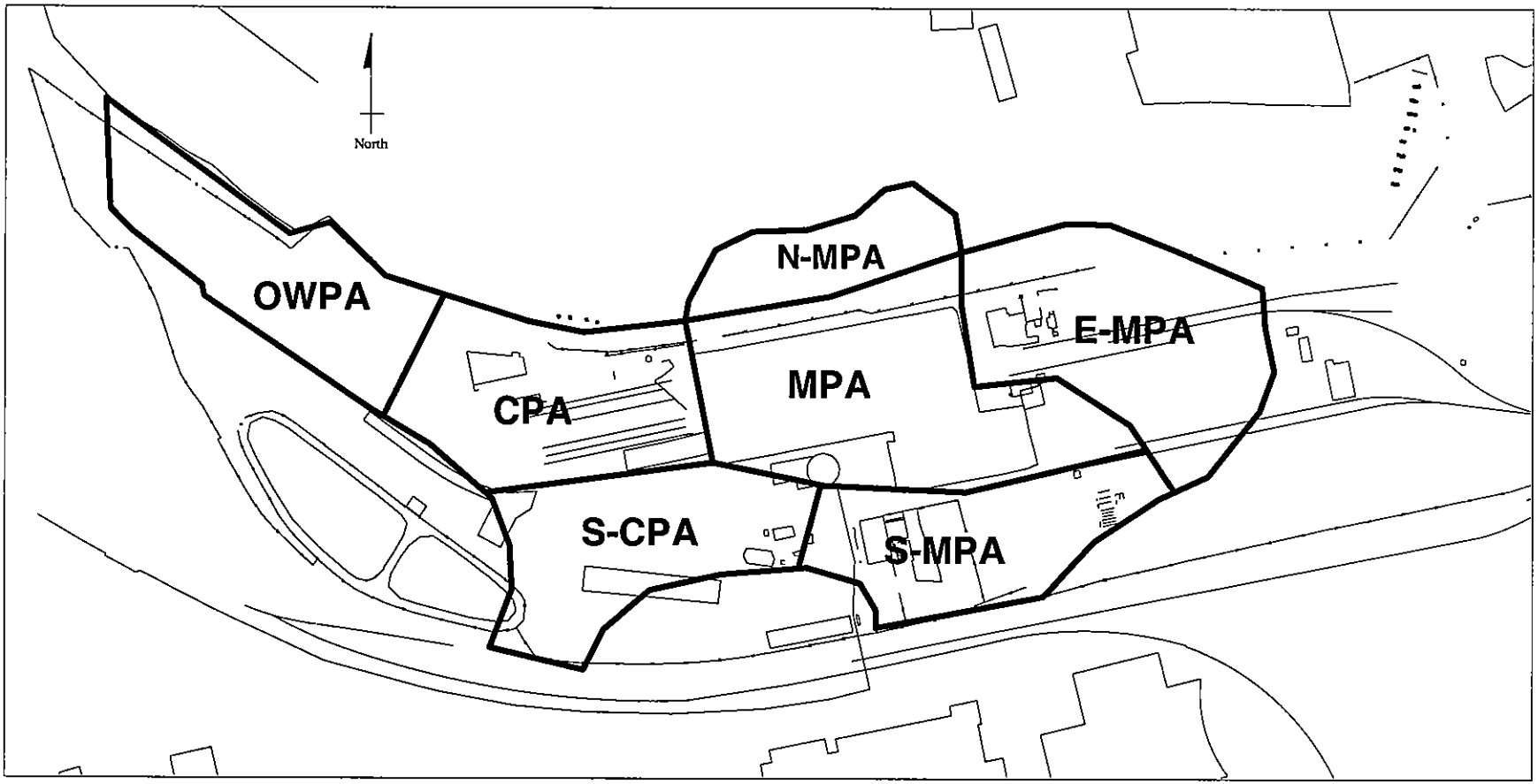
- Material costs for common items such as piping, fill, and other items are based on location-adjusted database sources.

- Rented construction equipment rates are from the *Rental Rate Blue Book for Construction Equipment*, published by Primedia Information, Inc. Operating costs for rented equipment are from the *Cost Reference Guide for Construction Equipment*, also published by Primedia. Operating and rental costs are adjusted for geographical area and for the latest fuel rates.

- Owned equipment rates are from the *Cost Reference Guide for Construction Equipment*, published by Primedia, adjusted for geographical area and fuel rates.

- Laboratory costs for geotechnical and chemical analyses are based on budgetary quotes from certified laboratories and past experience of URS staff.

- Disposal costs for wastes are based on quotes from local landfills and commercial treatment/disposal facilities, as well as prior experience of URS and SteamTech staff. Transportation costs are based on budgetary quotes from qualified haulers for construction and O&M waste streams.



LEGEND	
MPA	Main Processing Area
N-MPA	North-MPA
S-MPA	South MPA
E-MPA	East-MPA
CPA	Cellon Process Area
S-CPA	South CPA
OWPA	Oily Waste Ponds Area

Figure 2-1
Site Map of Main Impact Areas

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

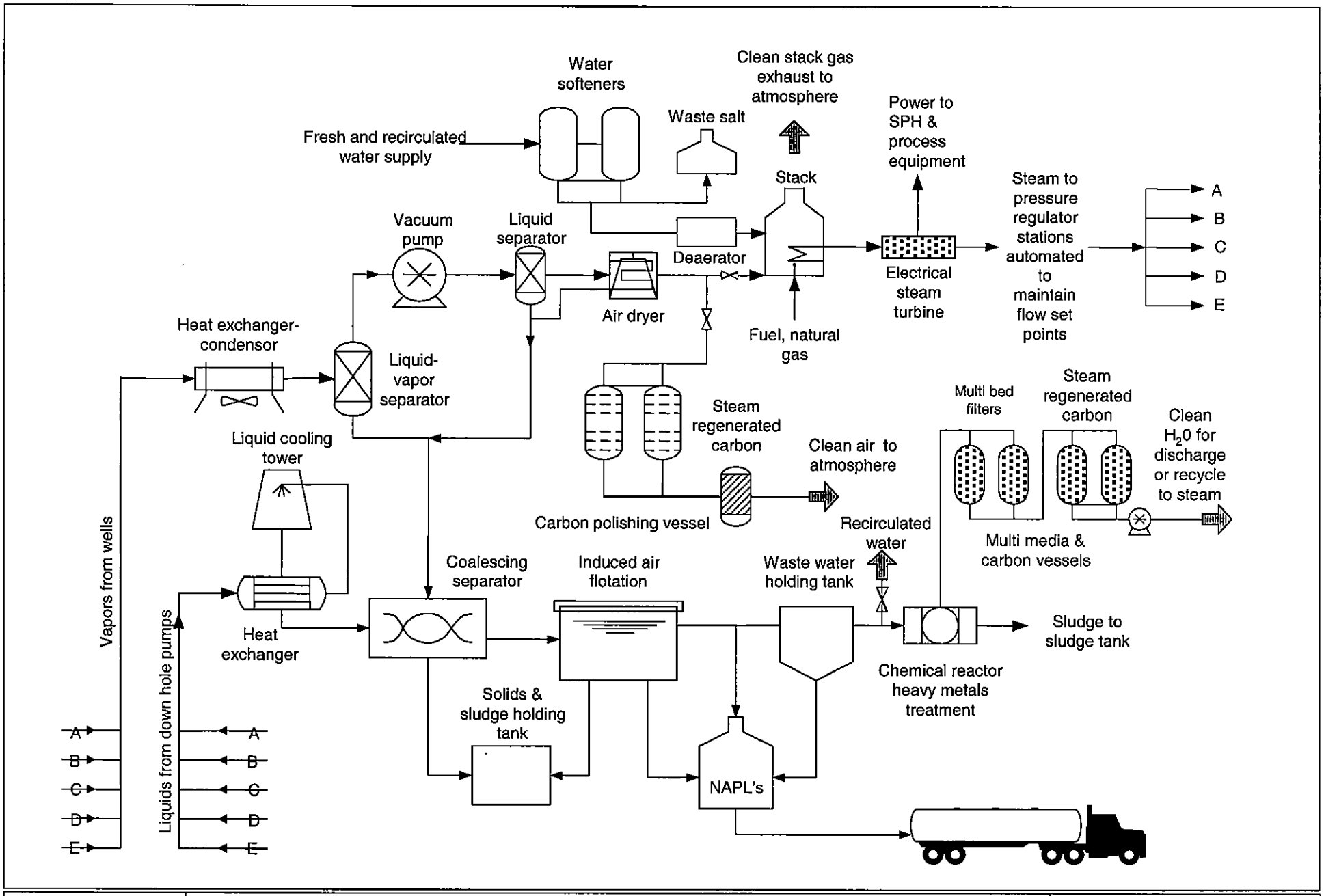


Figure 2-2
Thermal Treatment Process Diagram

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Table 2-1
Key Design Assumptions

Key Design Parameter or Assumption*	Thermal Treatment Scenario 1	Thermal Treatment Scenario 2	Thermal Treatment Scenario 3	Groundwater Pump-and-Treat System
General Assumptions				
Volume of NAPL impacted soil present in treatment area	1.54 million cubic yards	2.10 million cubic yards	2.95 million cubic yards	2.95 million cubic yards
Percentage of NAPL impacted soil present in entire site (2.95 million cubic yards) targeted by treatment system	52 percent	71 percent	100 percent	100 percent
Duration of active treatment	Steam injection – 4 years (Year 1 to 4); electrical resistance heating (ERH) – 2 years (Year 1 and 2); groundwater extraction – 7 years (Year 1 to 7).	Steam injection – 4 years (Year 1 to 4); electrical resistance heating (ERH) – 2 years (Year 1 and 2); groundwater extraction – 7 years (Year 1 to 7).	Steam injection – 4 years (Year 1 to 4); electrical resistance heating (ERH) – 2 years (Year 1 and 2); groundwater extraction – 7 years (Year 1 to 7).	NAPL/groundwater extraction – 30 years or 100 years.
Total project period (treatment and monitoring)	7 years of active treatment (steam, ERH, vapor/NAPL/ ground-water extraction); 30 years of monitoring.	7 years of active treatment (steam, ERH, vapor/NAPL/ ground-water extraction); 30 years of monitoring.	7 years of active treatment (steam, ERH, vapor/NAPL/ ground-water extraction); 30 years of monitoring.	30 years or 100 years (benchmark for comparison to thermal treatment scenarios).

Table 2-1 (Continued)
Key Design Assumptions

Key Design Parameter or Assumption*	Thermal Treatment Scenario 1	Thermal Treatment Scenario 2	Thermal Treatment Scenario 3	Groundwater Pump-and-Treat System
Treatment Components				
Primary subsurface treatment methods	Steam injection and electrical resistance heating (low-permeability soil zones) to increase contaminant mobility in soil/groundwater and promote *in situ* hydrous pyrolysis oxidation of contaminants.	Steam injection and electrical resistance heating (low-permeability soil zones) to increase contaminant mobility in soil/groundwater and promote *in situ* hydrous pyrolysis oxidation of contaminants.	Steam injection and electrical resistance heating (low-permeability soil zones) to increase contaminant mobility in soil/groundwater and promote *in situ* hydrous pyrolysis oxidation of contaminants.	Hydraulic control of groundwater, containment within site boundaries.
	Hydraulic control of groundwater, containment within site boundaries.	Hydraulic control of groundwater, containment within site boundaries.	Hydraulic control of groundwater, containment within site boundaries.	NAPL and groundwater extraction for aboveground treatment, disposal, and discharge.
	Vapor, NAPL, and groundwater extraction for aboveground treatment, disposal, and discharge.	Vapor, NAPL, and groundwater extraction for aboveground treatment, disposal, and discharge.	Vapor, NAPL, and groundwater extraction for aboveground treatment, disposal, and discharge.	
New subsurface installations for treatment area (totals, five aquifer zones)	Steam injection wells; 165 wells (19,674 linear feet)	Steam injection wells; 197 wells (23,069 linear feet)	Steam injection wells; 249 wells (30,099 linear feet)	Not applicable (N/A)
	NAPL/groundwater extraction wells; 123 wells (15,201 linear feet)	NAPL/groundwater extraction wells; 143 wells (17,691 linear feet)	NAPL/groundwater extraction wells; 167 wells (21,096 linear feet)	NAPL/groundwater extraction wells; 43 wells (3,660 linear feet)
	Reinjection wells (treated groundwater); 3 wells (840 linear feet)	Reinjection wells (treated groundwater); 3 wells (840 linear feet)	Reinjection wells (treated groundwater); 3 wells (840 linear feet)	N/A (surface discharge to Old Mormon Slough)
	Monitoring wells; 39 wells (5,580 linear feet)	Monitoring wells; 36 wells (5,115 linear feet)	Monitoring wells; 37 wells (5,270 linear feet)	Monitoring wells; 64 wells (8,605 linear feet)

Table 2-1 (Continued)
Key Design Assumptions

Key Design Parameter or Assumption[1]	Thermal Treatment Scenario 1	Thermal Treatment Scenario 2	Thermal Treatment Scenario 3	Groundwater Pump-and-Treat System
	Vertical electrode arrays; 38 arrays (10,060 linear feet)	Vertical electrode arrays; 40 arrays (11,720 linear feet)	Vertical electrode arrays; 40 arrays (15,760 linear feet)	N/A
Steam Generation	Two boilers (50,000 BTUs/hour each), natural gas-fired; turbine generators (electricity cogeneration via steam), water softeners (boiler water pre-treatment), deaerator	Three boilers (50,000 BTUs/hour each), natural gas-fired; turbine generators (electricity cogeneration via steam), water softeners (boiler water pre-treatment), deaerator	Four boilers (50,000 BTUs/hour each), natural gas-fired; turbine generators (electricity cogeneration via steam), water softeners (boiler water pre-treatment), deaerator	N/A
Electrical Resistance Heating	Electrical supply (onsite cogeneration, off-site power supply), electrical distribution/control systems	Electrical supply (onsite cogeneration, off-site power supply), electrical distribution/control systems	Electrical supply (onsite cogeneration, off-site power supply), electrical distribution/control systems	N/A
NAPL/Liquid Treatment	Heat recovery/cooling tower, coalescing plate separator, induced air flotation, gravity settling, multi-media filters, and liquid-phase GAC	Heat recovery/cooling tower, coalescing plate separator, induced air flotation, gravity settling, multi-media filters, and liquid-phase GAC	Heat recovery/cooling tower, coalescing plate separator, induced air flotation, gravity settling, multi-media filters, and liquid-phase GAC	Oil/water separation, bag filtration, fluidized bed bioreactor, liquid-phase GAC
Vapor Treatment	Recycling to steam boilers and vapor-phase GAC; heat exchanger, vacuum blower, liquid/vapor separator, air drier	Recycling to steam boilers and vapor-phase GAC; heat exchanger, vacuum blower, liquid/vapor separator, air drier	Recycling to steam boilers and vapor-phase GAC; heat exchanger, vacuum blower, liquid/vapor separator, air drier	Air scrubber included in packaged biological treatment plant.

Table 2-1 (Continued)
Key Design Assumptions

Key Design Parameter or Assumption*	Thermal Treatment Scenario 1	Thermal Treatment Scenario 2	Thermal Treatment Scenario 3	Groundwater Pump-and-Treat System
Process Demands				
Natural gas	100 million BTUs/hour	150 million BTUs/hour	200 million BTUs/hour	N/A
Electricity (electrical resistance heating)	5,100 kilowatts (kW) maximum; 2,550 kW average (Year 1 and 2)	7,400 kilowatts (kW) maximum; 3,680 kW average (Year 1 and 2)	7,400 kilowatts (kW) maximum; 3,680 kW average (Year 1 and 2)	N/A
Electricity (process equipment & other power requirements)	1,500 kW maximum; 800 – 1,000 kW for Years 1 through 4.	2,000 kW maximum; 1,000 – 1,400 kW for Year 1 through 4.	2,500 kW maximum; 1,200 – 1,800 kW for Year 1 through 4.	160 kW average for 30 or 100 years.
Electricity (co-generation during steam operations)	2,200 kW (Year 1) to 1,320 kW (Year 4)	3,300 kW (Year 1) to 1,980 kW (Year 4)	4,400 kW (Year 1) to 2,640 kW (Year 4)	N/A
Steam	93,000 pounds per hour (lbs/hour) – Year 1; 75,000 lbs/hour – Year 2 through 4	137,000 pounds per hour (lbs/hour) – Year 1; 101,000 lbs/hour – Year 2 through 4	193,000 pounds per hour (lbs/hour) – Year 1; 147,000 lbs/hour – Year 2 through 4	N/A
Water (steam generation)	200 gallons per minute (gpm) at Year 1, 100 gpm by Year 4; 10 gpm during cool-down	300 gallons per minute (gpm) at Year 1, 150 gpm by Year 4; 15 gpm during cool-down	400 gallons per minute (gpm) at Year 1, 200 gpm by Year 4; 20 gpm during cool-down	N/A
Water (process or other)	40 gpm	55 gpm	70 gpm	20 gpm
Extraction flows for treatment and disposal	475 gpm	575 gpm	700 gpm	235 gpm

Table 2-1 (Continued)
Key Design Assumptions

Key Design Parameter or Assumption[a]	Thermal Treatment Scenario 1	Thermal Treatment Scenario 2	Thermal Treatment Scenario 3	Groundwater Pump-and-Treat System
NAPL recovery (basis for waste disposal costs)	600,000 gallons over 7 years of operation; average of 85,714 gallons per year.	770,000 gallons over 7 years of operation; average of 110,000 gallons per year.	950,000 gallons over 7 years of operation; average of 135,714 gallons per year.	100,000 gallons over 100 years of operation, with 89,060 gallons recovered during the first 30 years of operation; average recovery decreases with time, ranging from 8,000 to 156 gallons per year.
Granular activated carbon (GAC) usage for liquid-phase effluent treatment	33,250 lbs (Year 1) to 2,375 lbs (Year 7); 105,688 lbs total (assumes onsite GAC regeneration, 20 cycles, then offsite disposal).	40,250 lbs (Year 1) to 2,875 lbs (Year 7); 127,938 lbs total (assumes onsite GAC regeneration, 20 cycles, then offsite disposal).	49,000 lbs (Year 1) to 3,500 lbs (Year 7); 155,750 lbs total (assumes onsite GAC regeneration, 20 cycles, then offsite disposal).	19,100 lbs per year for 30 years or 100 years.

[a] Design assumptions for the thermal treatment scenarios are from the 2001 conceptual design (USEPA 2001a). Design assumptions for the pump-and-treat system are from the 1998 feasibility study (USEPA 1998).

Table 2-2
Labor Markup Assumptions

	Assumed Markups for Labor Estimates						
	FICA	FUTA	SUI	WC	Benefits	OH	Total
Office staff (managers, engineers, clerical)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	120.00%
Field staff (engineers, managers, technicians)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	61.00%
Craft labor	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	41.45%

Notes:
1. Workman's Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction. Workman's Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group.
2. Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group. Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.
3. Overhead rates for craft labor are based on RS Means averages for larger construction companies. Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resources), training, medical surveillance, and other costs directly associated with craft labor. Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group. Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office. Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).
4. State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

Definitions:
FICA - Federal Insurance Contributions Act
FUTA - Federal Unemployment Tax Act
OH -Overhead
SUI - State Unemployment Insurance
WC - Workers Compensation

3.0 REMEDIAL ACTION COST EVALUATIONS

This section describes the major cost elements and assumptions used by URS to estimate the capital, O&M, and periodic costs for three thermal treatment scenarios developed by SteamTech/TRS and the groundwater pump-and-treat remedy developed by ICF Kaiser. The cost estimates for each thermal and pump-and-treat remedy are presented in appendixes. The estimates prepared by URS for the pump-and-treat remedy, which was the selected approach of the 1999 Record of Decision for this site, are based on information contained in documents available from USACE, including the feasibility study prepared by ICF Kaiser (USEPA 1998).

3.1 THERMAL TREATMENT SCENARIO 1—MPA, CPA, AND NORTH-MPA

Appendix A contains the cost estimates for Scenario 1. The Cost Estimate Summary and the Costlink© Scenario 1 Capital Costs and Operation & Maintenance Report are in Appendices A-1 and A-2, respectively. Total costs for Scenario 1 are discussed in Section 4, Life Cycle Cost and Present Value Analysis.

3.1.1 Capital Costs

The construction period for Scenario 1 is assumed to be 2 years, including 6 months of procurement/mobilization activities and 18 months of field construction. The cost estimate reflects a common convention of excluding the engineering and permitting period from the construction timeline. The time required for engineering, permitting, and competitive bidding of the work is of uncertain duration and would likely span 2 to 3 years if designed under the Superfund process. For estimating purposes, capital costs are treated as occurring in Year 0 of the project. Therefore, the costs of construction (whether actually spent over 1 or 3 years) are treated as a single expenditure in Year 0. The capital cost estimate is organized in the following major cost elements:

- General Conditions—This item accounts for field supervision and management; administration and home office support; purchasing; site security and emergency services; health and safety supplies; temporary construction facilities (office, equipment, supplies, etc.); and utilities for the construction period (phone, electric, water). Costs have also been allocated in this item for patent fees that may be applicable to the thermal treatment technologies. Patent fees and their potential impact on project costs are discussed in Section 5, Sensitivity Analysis.

- Submittals/Implementation Plans—The estimate includes the preparation of ten planning documents commonly required for government construction projects. These documents include the construction work plan; contractor quality control plan; chemical quality control plan; regulatory compliance plan; traffic plan; site health and safety plan; performance testing plan; environmental protection plan; emergency action plan; and a subcontracting plan.

- Engineering—The estimate includes process, civil, mechanical, and electrical design work to carry the project through full design, preparation of contract documents, and competitive bidding of the construction and O&M services.

- Mobilization, Site Work, and Temporary Facilities—This cost items includes mobilization of personnel and equipment; site preparation; clearing and grading; meetings; temporary facilities such as trailers, utilities (water, sewer, electrical, phones), and temporary paving; traffic controls; dust, erosion, and security controls; and establishing survey controls and the plant layout. This item also includes 1,000 linear feet of water line to provide potable and process water at the site and 800 linear feet of sewer line. The construction of a 10.9-acre gravel cap (6 inches thick) and a 0.9-acre, low-permeability asphalt cap for a portion of the Cellon Process Area is included to improve site access and reduce fugitive emissions during thermal treatment.

- Treatment System Construction—This portion of the cost estimate includes:

  - The treatment building and office

  - Major equipment for the thermal treatment system, including steam generation (two boilers, with electrical cogeneration) and the ERH system (electrical power supply and distribution)

  - Liquid/NAPL recovery and treatment, including a coalescing plate (oil/water) separator, induced air flotation, gravity settling tank, multimedia filters and liquid-phase granular activated carbon (GAC)

  - Vapor recovery and treatment, including vacuum blowers, vapor/liquid separation, and vapor-phase GAC

  - Waste and residuals management in tanks and bins

- Wells (steam injection, water/NAPL extraction, and treated water reinjection) and ERH probes

- Well and well-field instrumentation, including vertical electrode arrays, meters, and local and remote-sensing instruments, equipment for electrical resistance tomography (ERT) and distributed temperature sensing (DTS)

- Process piping, wiring, and accessories

- Start Up, Testing, and O&M Plans—This cost item includes labor, equipment, and materials for start up and system commissioning, including testing and development of O&M procedures for the thermal treatment system and its appurtenances. This work includes initial training of personnel, operation and calibration of equipment, utility commissioning and energy use (natural gas, electrical) for start up, process chemicals and consumables, and waste disposal.

- Demobilization—This item is for the demobilization of personnel, equipment, and materials at the completion of construction, including temporary facilities, utilities, and close-out reporting for the construction phase.

3.1.2 Operation and Maintenance Costs

The O&M period for Scenario 1 is assumed to be 30 years. Over that period, the level of operation and maintenance effort will vary according to the phase of treatment and monitoring. O&M costs associated with active thermal remediation by ERH and steam injection heating are incurred in Years 1 through 2 (ERH is shut down at the end of Year 2) and Years 1 through 4, respectively. Active thermal treatment by steam injection is completed in Year 4, followed by 3 years of subsurface cool-down. Vapor and groundwater extraction will occur from Years 1 through 7. The annual O&M cost has therefore been adjusted accordingly to reflect the differing levels of effort.

Operation and maintenance costs during subsurface cool-down are incurred in Years 5 through 7. Shutdown and decommissioning costs for the steam and ERH equipment are incurred in Year 7. Performance and compliance monitoring will occur during active thermal treatment with ERH (Years 1 and 2) and steam (Year 1 through 4), and during vapor and groundwater extraction (Years 1 through 7). Long-term confirmation monitoring of groundwater conditions occurs during Years 8 through 30.

The O&M cost estimates, by phase of operation, are organized in the following major cost elements:

- General Conditions—This cost item includes off-site administrative costs of the contractor to manage and control the project, process billings, and assist on-site personnel with O&M and data interpretation. This cost item also accounts for O&M for the ERH treatment system, which is only operated in Years 1 and 2 of the project. At the completion of Year 2, the ERH system is shut down.

- Site Facilities—This cost item includes labor, equipment, and materials to maintain on-site support equipment and facilities (nontreatment) for the O&M staff. This work begins in Year 1 and is completed at the end of Year 7.

- Health and Safety—This cost item captures equipment and material costs for on-site personnel health and safety.

- Materials and Supplies—This cost item includes routine maintenance, personnel, and office supplies for the maintenance staff assigned to the project site.

- Maintenance—This cost item includes process logic control system support, spare parts, and redevelopment of select wells on an annual basis.

- Utilities—This cost item includes natural gas and electrical costs for steam and ERH systems, NAPL/liquid and vapor extraction and treatment, sewer and water fees, and telephones. The cost of off-site electricity purchase is accounted for in the estimate, as well as the equivalent dollar value credited to the O&M cost for electricity produced on site by cogeneration during steam production for subsurface injection.

- Site O&M Labor—This cost item accounts for O&M labor associated with steam injection; NAPL and liquid extraction, treatment, and reinjection; and vapor extraction, treatment, and atmospheric discharge. This work begins in Year 1, with steam injection shut down at the end of Year 4. Vapor and groundwater extraction, treatment, and reinjection or discharge continues through Year 7. Costs are based on labor staffing (plant manager/lead operator, operator) for 24-hours-per-day operations, 365 days per year, as well as one full-time engineer/scientist to monitor and interpret site information and coordinate on-site O&M activities.

- Chemicals—This cost item accounts for the annual use and replacement of chemicals (GAC, caustic and acid, and polymers) used to condition and treat vapor, NAPL, and groundwater extracted during treatment (Years 1 through 7). Replacement schedules and quantities are based on SteamTech's evaluation of GAC consumption (USEPA 2001a) and URS' assumptions regarding other chemical use during each year of operation.

- Waste Disposal—This cost item includes spent GAC, sludge and settled solids, recovered NAPL, used personal protection equipment, and other oily wastes. Recovery of 600,000 gallons of NAPL in 7 years is assumed in the estimate. An average recovery and disposal of over 85,000 gallons per year of NAPL and other oily wastes is included in the O&M estimates for the 7 years of thermal treatment and cool-down. The largest quantities will likely be recovered during the 4-year active thermal treatment phase.

- Sampling and Analysis—This cost item accounts for four types of sampling and analysis (Table 3-1) that will be performed during the O&M phases of the thermal treatment project:

  - Performance monitoring samples are used to evaluate the performance of injection, extraction, and treatment systems, emphasizing control and management of the site during active thermal treatment and the cool-down phase. Parameters to be monitored during thermal treatment include electrical, temperature and steam distribution; contaminant removal; soil borings to confirm subsurface conditions during active thermal treatment; and groundwater monitoring to adjust and calibrate injection/extraction rates within the site. During cool-down, temperature, contaminant removal rates, and groundwater contaminant concentrations will be monitored.

  - Compliance monitoring samples are used to evaluate disposal and discharge activities during the thermal treatment phase, including boiler and fugitive air emissions, treatment plant discharges, perimeter groundwater monitoring, and waste disposal characterization. During cool-down, monitoring is scaled back as active thermal treatment ends.

  - Confirmational sampling is performed to evaluate the short- and long-term effectiveness of the remedy. For estimating purposes, this is limited to soil sampling activities during thermal treatment and the cool-down phase.

Borings to confirm post-treatment subsurface soil conditions are accounted for in the annual O&M estimates.

- Long-term monitoring is performed to assess changes due to the thermal treatment process and the groundwater impacts of residual contamination over the remainder of the 30-year period. Groundwater monitoring of designated wells within the treatment zone and the perimeter of the site is included in the O&M cost estimate.

- Sampling parameters, frequency, and monitoring locations indicated in the conceptual design (USEPA 2001a), and reflected in the cost estimates, are for comparative purposes only; actual requirements will be established as EPA proceeds to design construction, and operation of the remedial system.

- Data Validation—This cost item includes the cost of reviewing, validating, and interpreting sampling and analysis data collected for performance, compliance, confirmational, and long-term monitoring. As the quantity of data decreases with each phase of operation, these costs are reduced accordingly.

3.1.3 Periodic Costs

The estimate for Scenario 1 includes the following periodic costs:

- Reports—URS has assumed that the O&M plan for the thermal treatment system will be updated once during the first 5 years of the remedial action and that 5-Year Review Reports are prepared 5 times over the 30-year project. The remedial action report, consisting of project closeout documentation, an evaluation of post-treatment conditions, and long-term monitoring results, is assumed to be a one-time cost in Year 30.

- Equipment repairs/replacement—Active thermal treatment by steam and ERH is limited to Years 1 through 4, followed by three years of cool-down O&M. URS assumed that major capital items such as treatment equipment would not require replacement during that 7-year period. However, replacement of 50 percent of the extraction pumps is expected to occur. Extraction and injection wells are assumed to be functional for the four years of active thermal treatment and the three years of cool-down O&M; no replacement costs are included. Repair and replacement

of groundwater monitoring wells (10 wells replaced every 10 years) are included as a periodic cost.

- Demolition/restoration—Demolition of the thermal treatment system, including the treatment plant and building, injection/extraction wells, piping systems, and decommissioning of utility systems and other site improvements, is assumed to be a one-time cost in Year 7. Final demolition of site improvements, including monitoring wells, and confirmation sampling (borings) are also treated as a one-time cost in Year 30.

3.2 THERMAL TREATMENT SCENARIO 2—MPA, CPA, NORTH-MPA, SOUTH-MPA, AND SOUTH-CPA

Appendix B contains the cost estimates for Scenario 2. The Cost Estimate Summary and the Costlink© Scenario 2 Capital Costs and Operation & Maintenance Report are in Appendix B-1 and B-2, respectively. Total costs for Scenario 2 are discussed in Section 4, Life Cycle Cost and Present Value Analysis.

3.2.1 Capital Costs

The construction period for Scenario 2 is assumed to be 2 years, including 6 months of procurement/mobilization activities and 18 months of field labor. This is the same assumption as in Scenario 1. The addition of the South-MPA and South-CPA is reflected in increased labor, equipment, and material costs, while assuming that these activities will still occur in the same construction period. For estimating purposes, capital costs are treated as occurring in Year 0 of the project.

The cost items used for the Scenario 2 capital cost estimate are identical to Scenario 1. The labor, equipment, and material costs allocated to each major cost item have been increased due to the addition of the South-MPA and South-CPA. The primary differences accounted for in Scenario 2 include the following:

- Mobilization, Site Work, and Temporary Facilities—The gravel cap construction for Scenario 2 has increased to 12.7 acres; Scenario 1 is based on 10.9 acres.

- Treatment System Construction—Scenario 2 has three boilers (with electrical cogeneration units), increased numbers of wells (steam injection, water/NAPL extraction) and well/well-field instrumentation, and additional process piping,

wiring, and accessories. Major equipment for vapor and NAPL/water treatment and disposal are assumed to increase in size, but will not require additional units or changes in the overall process train.

- Start Up, Testing, and O&M Plans—The labor, equipment, and material costs for this effort have been adjusted to reflect the larger treatment volumes of Scenario 2.

3.2.2 Operation and Maintenance Costs

The operation and maintenance costs for Scenario 2 are similar to Scenario 1 in terms of activity types, but reflect the larger area and volumes of contamination targeted by this scenario. The O&M period for Scenario 2 is 30 years. Over that period, the level of O&M effort will vary according to the phase of treatment and monitoring. The annual O&M costs have been adjusted to reflect the phase of operation and the larger treatment volumes of Scenario 2. Operation and maintenance costs associated with active thermal remediation by ERH and steam injection heating are incurred in Years 1 through 2 (ERH is shut down at the end of Year 2) and Years 1 through 4, respectively. Active thermal treatment by steam injection is completed in Year 4, followed by 3 years of subsurface cool-down. Vapor and groundwater extraction will occur from Years 1 through 7. The annual O&M costs reflect the differing levels of effort.

Operation and maintenance costs during subsurface cool-down are incurred in Years 5 through 7. Shutdown and decommissioning costs for the steam and ERH equipment are incurred in Year 7. Performance and compliance monitoring will occur during active thermal treatment with ERH (Years 1 and 2) and steam (Years 1 through 4), and during vapor and groundwater extraction (Years 1 through 7). Long-term confirmation monitoring of groundwater conditions occurs during Years 8 through 30.

The O&M cost estimates for Scenario 2, by phase of operation, are organized as in Scenario 1. The estimates for Scenario 2 reflect the increased treatment volumes, energy demand (natural gas, electricity), chemical usage, and waste disposal expected for the scenario. Recovery of 770,000 gallons of NAPL in 7 years is assumed in the estimate.

3.2.3 Periodic Costs

The periodic costs for Scenario 2 are similar to Scenario 1 and include the following:

- Reports—URS has assumed that the O&M plan for the thermal treatment system will be updated once during the first 5 years of the remedial action, and that

5-year review reports are prepared five times over the 30-year project. The remedial action report, consisting of project closeout documentation, an evaluation of post-treatment conditions, and long-term monitoring results, is assumed to be a one-time cost in Year 30.

- Equipment repairs/replacement—Active thermal treatment by steam and ERH is limited to Years 1 through 4, followed by 3 years of cool-down O&M. URS assumed that major capital items such as treatment equipment would not require replacement during that 7-year period. However, replacement of 50 percent of the extraction pumps is expected to occur. Extraction and injection wells are assumed to be functional for the 4 years of active thermal treatment and the 3 years of cool-down O&M; no replacement costs are included. Repair and replacement of groundwater monitoring wells (10 wells replaced every 10 years) are included as a periodic cost.

- Demolition/restoration—Demolition of the thermal treatment system, including the treatment plant and building, injection/extraction wells, piping systems, and the decommissioning of utility systems and other site improvements, is assumed to be a one-time cost in Year 7. Final demolition of site improvements, including monitoring wells, and confirmation sampling are also treated as a one-time cost in Year 30.

3.3 THERMAL TREATMENT SCENARIO 3—MPA, CPA, NORTH-MPA, SOUTH-MPA, SOUTH-CPA, EAST-MPA, AND OWPA

Appendix C contains the cost estimates for Scenario 3. The Cost Estimate Summary and the Costlink© Scenario 3 Capital Costs and Operation & Maintenance Report are in Appendix C-1 and C-2, respectively. Total costs for Scenario 3 are discussed in Section 4, Life Cycle Cost and Present Value Analysis.

3.3.1 Capital Costs

The construction period for Scenario 3 is assumed to be 2 years, including 6 months of procurement/mobilization activities and 18 months of field labor. This is the same assumption as Scenarios 1 and 2. The addition of the South-MPA, South-CPA, East-MPA, and OWPA is reflected in increased labor, equipment, and material costs, while assuming that these activities will still occur in the same construction period. For estimating purposes, capital costs are treated as occurring in Year 0 of the project.

The cost items used for the capital the cost estimate for Scenario 3 are identical to Scenarios 1 and 2. The labor, equipment, and material costs allocated to each major cost item have been increased due to the addition of the South-MPA, South-CPA, East-MPA, and OWPA. The primary differences accounted for in Scenario 3 include the following:

- Mobilization, Site Work, and Temporary Facilities—The gravel cap construction for Scenario 3 has increased to 22.2 acres; Scenarios 1 and 2 are based on 10.9 acres and 12.7 acres, respectively.

- Treatment System Construction—Scenario 3 has four boilers (with electrical cogeneration units), increased numbers of wells (steam injection, water/NAPL extraction) and well/well-field instrumentation, and additional process piping, wiring, and accessories. Major equipment for vapor and NAPL/water treatment and disposal are assumed to increase in size, but will not require additional units or changes in the overall process train.

- Start Up, Testing, and O&M Plans—The labor, equipment, and material costs for this effort have been adjusted to reflect the larger treatment volumes of Scenario 3.

3.3.2 Operation and Maintenance Costs

The operation and maintenance costs for Scenario 3 are similar to Scenarios 1 and 2 in terms of activity types, but reflect the larger area and volumes of contamination targeted by this scenario. The O&M period for Scenario 3 is 30 years. Over that period, the level of O&M effort will vary according to the phase of treatment and monitoring. The annual O&M costs have been adjusted to reflect the phase of operation and the larger treatment volumes of Scenario 3. O&M costs associated with active thermal remediation by ERH and steam injection heating are incurred in Years 1 through 2 (ERH is shut down at the end of Year 2) and Years 1 through 4, respectively. Active thermal treatment by steam injection is completed in Year 4, followed by 3 years of subsurface cool-down. Vapor and groundwater extraction occurs from Years 1 through 7.

Operation and maintenance costs during subsurface cool-down are incurred in Years 5 through 7. Shutdown and decommissioning costs for the steam and ERH equipment are incurred in Year 7. Performance and compliance monitoring occur during active thermal treatment with ERH (Years 1 and 2) and steam (Years 1 through 4) and during vapor and groundwater extraction (Years 1 through 7). Long-term confirmation monitoring of groundwater conditions occurs during Years 8 through 30.

The O&M cost estimates for Scenario 3, by phase of operation, are organized as in Scenarios 1 and 2. The estimates for Scenario 3 reflect the increased treatment volumes, energy demand (natural gas, electricity), chemical usage, and waste disposal expected for the scenario.

3.3.3 Periodic Costs

Scenario 3's periodic costs are similar to Scenarios 1 and 2. The periodic costs accounted for in the estimates include reports, equipment repair and replacement, and demolition and restoration activities. The expected level of effort for Scenario 3 reflects additional labor, equipment, and material costs associated with the larger treatment volumes of this scenario.

3.4 PUMP-AND-TREAT SYSTEM

A groundwater pump-and-treat system, which is the interim selected remedy recorded in the 1999 Record of Decision, is described in McCormick and Baxter soils and groundwater feasibility study report (USEPA 1998). The pump-and-treat system evaluated by URS is referred to in the report as Groundwater Treatment Alternative GW-4—Hydraulic Containment and NAPL Removal. This pump-and-treat system is based on proven and widely used technologies for hydraulic containment, capture, and recovery of free-phase and dissolved contaminants in the groundwater, as well as liquid-phase treatment using biological and chemical processes common in many conventional wastewater treatment systems. The specific treatment processes include oil/water separation, biological treatment to reduce organic loads, filtration, and adsorption with liquid-phase GAC prior to discharge into the adjacent slough.

A major factor influencing the cost of pump-and-treat remediation is the long period of operation required to produce any significant reduction in the contaminant mass present at the site, often resulting in treatment operations that span decades. The 1998 feasibility study was based on an assumed operating period of 30 years (USEPA 1998), in accordance with EPA feasibility study guidance at that time. Evaluations performed by ICF Kaiser (USEPA 1998) and USACE suggest that the actual period of operation could range from hundreds to thousands of years due to the nature and distribution of the contaminants within the site's five aquifer zones.

As a basis for comparison with the three thermal treatment scenarios discussed in this section, EPA and USACE requested that URS review the 1998 estimates for the selected pump-and-treat alternative and develop an independent estimate for its implementation. URS has prepared an updated, "bottom-up" estimate (Appendix D) of the type of costs and level of effort required to implement the pump-and-treat approach, as well as the cumulative costs for 30 and 100 years of system operation and maintenance.

Appendix D contains the cost estimates for the pump-and-treat remedy, based on 30 and 100 years of system operation and maintenance. The Cost Estimate Summary and the Costlink© Pump-and-Treat Capital Costs and Operation & Maintenance Report are in Appendix D-1 and D-2, respectively. Total costs for the pump-and-treat system are discussed in Section 4, Life Cycle Cost and Present Value Analysis.

3.4.1 Capital Costs

The construction period for the pump-and-treat remedy is assumed to be 2 years, including 6 months of procurement/mobilization activities and 18 months of field construction. EPA's 1998 estimate for Alternative GW-4 assumed design, permitting, procurement, and construction in an 18- to 20-month period. For estimating purposes, capital costs are treated as occurring in Year 0 of the project. The capital cost estimate is organized in the following major cost elements:

- General Conditions—This item accounts for field supervision and management; administration and home office support; purchasing; site security and emergency services; health and safety supplies; temporary construction facilities (office, equipment, supplies, etc.); and utilities for the construction period (phone, electric, water).

- Submittals/Implementation Plans—The estimate includes the preparation of ten planning documents commonly required for government construction projects. These documents include the construction work plan; contractor quality control plan; chemical quality control plan; regulatory compliance plan; traffic plan; site health and safety plan; performance testing plan; environmental protection plan; emergency action plan; and a subcontracting plan.

- Engineering—The estimate includes process, civil, mechanical, and electrical design work to carry the pump-and-treat project through full design, preparation of contract documents, and competitive bidding of the construction and O&M services.

- Mobilization, Site Work, and Temporary Facilities—This cost item includes mobilization of personnel and equipment; site preparation; clearing and grading; meetings; temporary facilities such as trailers, utilities (water, sewer, electrical, phones), and temporary paving; traffic controls; dust, erosion, and security controls; and establishing survey controls and the plant layout. This item also includes 1,000 linear feet of water line to provide potable and process water at the site and 800 linear feet of sewer line.

- Treatment System Construction—This portion of the cost estimate includes:
  - The treatment plant building and office
  - Major process equipment for the treating the pump-and-treat system's extracted NAPL and groundwater, including an oil/water separator, bag filters, a fixed-film bioreactor system (based on a fluidized bed reactor system manufactured by U.S. Filter–Envirex Products), and final polishing of the plant effluent with liquid-phase GAC to meet water quality standards prior to discharge into an adjacent waterbody (Old Mormon Slough)
  - Waste and residuals management in tanks and bins
  - Wells for water/NAPL extraction
  - Well and well-field instrumentation, including meters, level controllers, pressure indicators, and local/remote-sensing instruments
  - Process piping, wiring, and accessories
- Start Up, Testing, and O&M Plans—This cost item includes labor, equipment, and materials for start up and system commissioning, including testing and development of O&M procedures for the pump-and-treat system and its appurtenances. This work includes initial training of personnel, operation and calibration of equipment, utility commissioning and energy use for start up, process chemicals and consumables, and waste disposal.
- Demobilization—This item is for the demobilization of personnel, equipment, and materials at the completion of construction, including temporary facilities, utilities, and close-out reporting for the construction phase.

3.4.2 Operation and Maintenance Costs

URS evaluated the costs associated with a 30- and 100-year O&M period for the pump-and-treat system. O&M costs associated with NAPL/groundwater extraction and treatment are assumed to be consistent over the 30- or 100-year period, with no significant variations after initial startup and commissioning of the pump-and-treat system. Performance and compliance monitoring for

the extraction and treatment systems are accounted for in the cost estimates, as well as short- and long-term sampling to monitor site conditions.

The O&M costs for the pump-and-treat system are assumed to be incurred for the duration of the 30- or 100-year period. The annual O&M cost estimates are organized in the following major cost elements:

- General Conditions—This cost item includes off-site administrative costs of the contractor to manage and control the project, process billings, and assist on-site personnel with O&M and data interpretation.

- Site Facilities—This cost item includes labor, equipment, and materials to maintain on-site support equipment and facilities (nontreatment) for the O&M staff.

- Health and Safety—This cost item captures equipment and material costs for on-site personnel health and safety.

- Materials and Supplies—This cost item includes routine maintenance, personnel, and office supplies for the maintenance staff assigned to the project site.

- Maintenance—This cost item includes process logic control system support, spare parts, and redevelopment of select wells on an annual basis.

- Utilities—This cost item includes electrical costs for the pump-and-treat system (pumps, treatment units), area lighting, and telephones.

- Site O&M Labor—This cost item accounts for O&M labor for the pump-and-treat system's NAPL/groundwater extraction and treatment equipment, process monitoring and control, and discharge compliance. Costs are based on labor staffing (plant manager/lead operator, operator) for 8 hours per day, 5 days per week, and 52 weeks per year to monitor and interpret site information and coordinate on-site O&M activities.

- Chemicals—This cost item accounts for the annual use and replacement of chemicals (GAC, nutrient addition to the bioreactor) and oxygen addition for the bioreactor. Replacement schedules and quantities for each year of operation are based on information obtained from U.S. Filter–Envirex Products.

- Waste Disposal—This cost item includes sludge and settled solids, recovered NAPL, used personal protection equipment, and other oily wastes. Recovery and disposal of 100,000 gallons of NAPL and other oily wastes over 100 years is included in the O&M estimates, or about 10 percent of the estimated quantity of NAPL present (USEPA 2001a). Approximately 90 percent of the NAPL is recovered during the first 30 years of system operation.

- Sampling and Analysis—This cost item accounts for four types of sampling and analysis (Table 3-2) that will be performed during the O&M phases of the pump-and-treat remedy:

  - Performance monitoring samples are used to evaluate the performance of the extraction and NAPL/groundwater treatment systems, emphasizing control and management of the site. The monitoring activities include flow rates and volumes of NAPL/groundwater extracted; baseline monitoring of influent conditions; opportunistic soil samples during extraction well construction; and process control samples to monitoring the performance and effectiveness of the physical, biological and chemical treatment units of the treatment plant.

  - Compliance monitoring samples are used to evaluate disposal and discharge activities associated with the pump-and-treat system, including the treatment plant discharges, perimeter groundwater monitoring, fugitive emissions and perimeter air quality monitoring, and waste disposal characterization.

  - Confirmational sampling is performed to evaluate the short- and long-term effectiveness of the remedy. Borings to confirm post-treatment subsurface soil conditions (a one-time event in either Year 30 or 100) are treated as a periodic cost in the estimate.

  - Long-term monitoring is performed to assess changes due to the thermal treatment process and the groundwater impacts of residual contamination over the remainder of the 30-year or 100-year period. Groundwater monitoring of designated wells within the treatment zone and the perimeter of the site are included.

  - Sampling parameters, frequency, and monitoring locations indicated in Table 3-2, and reflected in the cost estimates, are for comparative purposes

only; actual requirements will be established as EPA proceeds to design, construction, and operation of the remedial system.

- Data Validation — This cost item includes the cost of reviewing, validating, and interpreting sampling and analysis data collected for performance, compliance, confirmational, and long-term monitoring.

3.4.3 Periodic Costs

The estimates for the pump-and-treat system were developed for 30 and 100 years of operation. The following periodic costs are included in the estimates:

- Reports—URS has assumed that the O&M plan for the pump-and-treat system will be updated every 5 years during the 30- to 100-year cleanup operations. Additionally, the preparation of 5-year review reports for EPA during this period are included as periodic costs. The remedial action report, consisting of project closeout documentation, an evaluation of post-treatment conditions, and long-term monitoring results, is assumed to be a one-time cost in Year 30 or 100.

- Equipment repairs/replacement—Active NAPL recovery and groundwater treatment will occur throughout the 30- or 100-year evaluation period. Unlike the thermal treatment scenarios, major process equipment and accessories are expected to require periodic demolition and replacement as they age. For estimating purposes, the demolition and replacement of the following items are included as periodic costs:

  - Treatment Plant Building—The building's user life is estimated to be 20 years; accordingly, the estimates reflect demolition and reconstruction of the pre-engineered metal structure every 20 years.

  - Bioreactor—With an estimated user-life of 20 years, the bioreactor will require demolition and replacement once during the first 30 years of operation and up to four times over a 100-year period.

  - GAC Vessels—Assuming a user-life of 20 years, the treatment system's liquid-phase GAC vessels will require demolition and replacement at least once during the first 30 years of operation and up to four times over a 100-year period.

- Miscellaneous Equipment—Replacement of items ranging from valves and sensors to process control equipment and computers is treated as a cash allowance for every 5 years of O&M, and accounted for as a major periodic cost on a 20-year cycle.

- Extraction Pumps—With expected groundwater conditions and contaminants, the extraction pump manufacturers have suggested an average user-life of 5 years; accordingly, the estimates reflect removal/disposal and replacement of the 43 pumps every 5 years.

- Well Repairs/Replacement—Extraction wells will require periodic replacement. For this estimate, replacement costs for one-third of the 43 extraction wells are included for every 10 years of system operation. Repair and replacement of groundwater monitoring wells may be required on an infrequent basis, but is not included as a specific periodic cost; the cost allocations for the extraction wells are assumed to be sufficient to cover monitoring well repair and replacement.

- Demolition/restoration—Demolition of the pump-and-treat system, including the treatment plant and building, NAPL/groundwater extraction wells, monitoring wells, confirmation sampling (borings), piping systems, and decommissioning of utility systems and other site improvements is assumed to be a one-time cost in either Year 30 or 100.

Table 3-1
Thermal Treatment Scenarios—Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[b]
Performance Monitoring—Steam Phase					
ERT data	Subsurface	Temperature	Daily/weekly/ monthly (see Table 6-1)	41 to 63 vert. 4 horizontal	NA
Electrical	System	Amps and power	weekly	59 ERH electrodes	NA
Temperature/DTS distribution	Wellhead	Temperature	daily/weekly (see Table 6-1)	301 to 416 wells	NA
Steam distribution	Wellhead	Liquid flow	Continuous	169 to 249	NA
	Wellhead, boiler plant, treatment plant	Pressure	Continuous	200 to 300	NA
Contaminant removal rate	NAPL (at wellhead)	Volume	weekly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	weekly	4 to 6	NA
		TOC	weekly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Well installation	Soil	Visual	initial	20	20
Soil borings[a]		TPH	Confirmation	20	20
		PAHs	Confirmation	20	20
		PCP	Confirmation	20	20
Interim drill-back	Soil	TPH	Annual[c]	50[d]	50[d]
Soil borings		PAHs	Annual[c]	50[d]	50[d]
		PCP	Annual[c]	50[d]	50[d]
Groundwater monitoring[a]	Water	TOC	Initial	60	60
		PAHs	Initial	60	60
		PCP	Initial	60	60
		Metals[b]	Initial	60	60
		Dioxins/furans	Initial	10	10
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Cool Down Phase					
Temperature/DTS distribution	Subsurface	Temperature	Monthly (see Table 6-1)	301 to 416 wells	NA

Table 3-1 (Continued)
Thermal Treatment Scenarios—Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[h]
Performance Monitoring—Steam Phase (Continued)					
Contaminant removal rate	NAPL (at wellhead)	Volume	Monthly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Monthly	4 to 6	NA
		TOC	Monthly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Compliance Monitoring—Steam Phase					
Boiler air emissions/stack monitoring	Gas	VOCs	Initial	1	4[i]
		SVOCs[e]	Initial	1	4[i]
		Dioxins/furans	Initial	1	4[i]
		Metals[f]	Initial	1	4[i]
		PM	Initial	1	4[i]
		HCl	Initial	1	4[i]
		Cl_2	Initial	1	4[i]
		Total hydrocarbons	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
		Opacity	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Monthly	3	36
		PCP	Monthly	3	36
		PM_{10}	Monthly	3	36
		Metals	Monthly	3	36
		CO	CEMS	3	NA
		SO_x	CEMS	3	NA
		NO_2	CEMS	3	NA

Table 3-1 (Continued)
Thermal Treatment Scenarios—Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[h]
Compliance Monitoring—Steam Phase					
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[b]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Quarterly	1	4
		PAHs	Quarterly	1	4
		PCP	Quarterly	1	4
		Metals[b]	Quarterly	1	4
		Dioxins/furans	Quarterly	1	4
	Solids (well)	TCLP[g]	Quarterly	1	4
	Solids (SAC)	TCLP[g]	Quarterly	1	4
	Solids (sludge)	TCLP[g]	Quarterly	1	4
	Solids (spent filter media)	TCLP[g]	Quarterly	1	4
Perimeter groundwater monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[b]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Cool Down Phase					
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[b]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Annually	1	1
		PAHs	Annually	1	1
		PCP	Annually	1	1
		Metals[b]	Annually	1	1
		Dioxins/furans	Annually	1	1
	Solids (well)	TCLP[g]	Annually	1	1
	Solids (SAC)	TCLP[g]	Annually	1	1

Table 3-1 (Continued)
Thermal Treatment Scenarios—Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[h]
Compliance Monitoring—Cool Down Phase					
Waste disposal characterization (cont.)	Solids (sludge)	TCLP[g]	Annually	1	1
	Solids (spent filter media)	TCLP[g]	Annually	1	1
Perimeter groundwater monitoring	Water	TPH	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[b]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Confirmational Sampling					
Soil borings	Soil	LIF survey	Final	4 weeks	4 weeks
		NAPL mobility leach test[j]	Final	10	10
		TPH	Final	10	10
		PAHs	Final	10	10
		PCP	Final	10	10
Long-Term Monitoring (30 Years)					
Groundwater monitoring (perimeter and treatment zones)	Water	PAHs	Annually	25	25
		PCP	Annually	25	25

[a]Includes baseline sampling and analysis during system (e.g., wells) installation.
[b]Metals include As, Cr, Cu, and Zn.
[c]Will be conducted for years 2, 3, and 4 (i.e., 3 times over the course of the steam treatment period).
[d]Assumes 5 samples from each of 10 borings.
[e]SVOCs include PAHs and PCP.
[f]40 CFR 266.106 provides standards to control metals emissions. Subpart I regulated metals include Ag, As, Ba,
[g]Leachate from TCLP analyzed for As, Cr, and SVOCs
[h]Total number of samples does not include QA samples. QA samples are 10% per batch.
[i]Includes 3 samples taken from 1 boiler stack and 1 blank.
[j]NAPL mobility leach test: Product leaching study; methodology to be determined.

Notes:
Performance monitoring: Monitor system performance during remediation; includes steam phase and cool down period.
Compliance monitoring: Monitor compliance with disposal/discharge requirements; includes steam phase and cool down period.
Confirmational sampling: To confirm "long-term effectiveness" of the remediation performed.

Be, Cd, Cr, Hg, Pb, Sb, and Th. Of these metals, As and Cr of are concern at the site.

Table 3-1 (Continued)
Thermal Treatment Scenarios—Performance and Compliance Monitoring

Ag: silver
As: arsenic
Ba: barium
Be: beryllium
Cd: cadmium
CEMS: continuous emissions monitoring system
Cl_2: chlorine gas
CO: carbon monoxide
CO_2: carbon dioxide
COCs: chemicals of concern (PAHs, PCP, dioxins/furans, As, Cr, Cu, and Zn)
Cr: chromium
Cu: copper
HCl: hydrogen chloride
Hg: mercury
LIF: laser-induced fluorescence
NO_x: nitrogen oxides
O_3: ozone
PAHs: polynuclear aromatic hydrocarbons
Pb: lead
PCP: pentachlorophenol
PM: particulate matter
SAC: spent activated carbon
Sb: antimony
SO_x: sulfur oxides
SVOCs: semivolatile organic compounds
TAPs: toxic air pollutants
TCLP: toxicity leaching procedure
Th: thallium
TOC: total organic carbon
TPH: total petroleum hydrocarbons
VOCs: volatile organic compounds
Zn: zinc

Table 3-2
Groundwater Pump-and-Treat Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total Per Event
Performance Monitoring—Groundwater Pump-and-Treat System					
NAPL/Groundwater	NAPL/Water	Flow	Continuous	43	N/A
Recovery Rate		Volume	Continuous	43	N/A
Groundwater Monitoring[a]	Water	TOC	Initial ops	43	43
		PAHs	Initial ops	43	43
		PCP	Initial ops	43	43
		Metals[b]	Initial ops	43	43
		Dioxins/furans	Initial ops	10	10
Well installation (soil)[a,d]	Soil	TPH	Initial constr.	43	100
		PAHs	Initial constr.	43	100
		PCP	Initial constr.	43	100
Groundwater Treatment Plant Monitoring[c]	Water	TOC	Weekly	3	156
		BOD	Weekly	3	156
		COD	Weekly	3	156
		TDS	Weekly	3	156
		TSS	Weekly	3	156
		TPH	Weekly	3	156
		PAHs	Weekly	1	52
		PCP	Weekly	1	52
		Metals[b]	Monthly	3	36
		Dioxins/furans	Semi-annual	3	6
Compliance Monitoring—Groundwater Pump-and-Treat System					
Site Fugitive Emissions/ Air Quality Perimeter Monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Perimeter Groundwater Monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[b]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Treatment Plant Discharge (NPDES surface water)	Water	TPH	Mth composite	1	12
		PAHs	Mth composite	1	12
		PCP	Mth composite	1	12
		Metals[b]	Mth composite	1	12
		Dioxins/furans	Quarterly	1	4
Waste Disposal Characterization	NAPL	TPH	Quarterly	1	4
		SVOCs[e]	Quarterly	1	4
		Metals[b]	Quarterly	1	4
	Solids (wells)	TCLP[f]	Quarterly	1	4

Table 3-2 (Continued)
Groundwater Pump-and-Treat Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total Per Event
	Solids (spent GAC)	TCLP[f]	Quarterly	1	4
	Solids (biosolids & sludges)	TCLP[f]	Quarterly	1	4
	Solids (spent filter media)	TCLP[f]	Quarterly	1	4
Confirmational Sampling—Groundwater Pump-and-Treat System					
Soil Borings	Soil	LIF survey	Post-treatment	4 weeks	4 weeks
		NAPL mobility leach test[h]	Post-treatment	10	10
		TPH	Post-treatment	40	200[d]
		PAHs	Post-treatment	40	200[d]
		PCP	Post-treatment	40	200[d]
Long-term Monitoring—Groundwater Pump-and-Treat System (30 to 100 Years)					
Groundwater Monitoring (perimeter and treatment Zones)	Water	PAHs	Annually	25	25
		PCP		25	25

[a]Includes baseline sampling and analysis during system (e.g., wells) installation.
[b]Metals include arsenic, chromium, copper, and zinc.
[c]Field and laboratory analyses are indicated; field analyses assumed to be BOD, COD, TDS, and TSS.
[d]Assumes 3 samples (performance - well construction) or 5 samples (confirmational) from each boring ("sampling point").
[e]SVOCs include PAHs and PCP; low-detection limit analyses required.
[f]Leachate from TCLP analyzed for arsenic, chromium, and SVOCs.
[g]Total number of samples does not include quality assurance/quality control (10 percent per batch of samples).
[h]NAPL mobility leach test: Product leachate test; methodology to be determined.

Notes:
Performance monitoring: Monitor system performance during pump-and-treat remediation; includes baseline and treatment process control.
Compliance monitoring: Monitor compliance with disposal/discharge requirements, including NPDES permit.
Confirmational sampling: To confirm "long-term effectiveness" of the pump-and-treat remediation.

As - arsenic
BOD - biological oxygen demand (5-day)
Cd - cadmium
COD - chemical oxygen demand
Cr - chromium

Table 3-2 (Continued)
Groundwater Pump-and-Treat Performance and Compliance Monitoring

GAC - granular activated carbon
LIF - laser-induced fluorescence
NAPL - nonaqueous-phase liquid
PAHs - polynuclear aromatic hydrocarbons
PCP - pentachlorophenol
PM - particulate matter
SVOCs - semivolatile organic compounds
TCLP - toxicity characteristic leaching procedure
TDS - total dissolved solids
TOC - total organic carbon
TPH - total petroleum hydrocarbons
TSS - total suspended solids

4.0 LIFE CYCLE COST AND PRESENT VALUE ANALYSIS

Table 4-1 is a summary of the capital costs, annual O&M costs, periodic costs, and the life cycle cost for the three thermal treatment scenarios and the groundwater pump-and-treat system. The present value of each remedy's life cycle costs is also calculated, based on a 7 percent discount rate (USEPA 2000a). A brief discussion of the thermal and pump-and-treat remedy cost evaluation is presented in this section.

4.1 THERMAL TREATMENT COSTS

4.1.1 Capital Costs

The capital costs for the three thermal treatment scenarios range from $33.58 million (targeting an estimated 52 percent of the known/suspected NAPL impacted soil present in the site) to $44.63 million (100 percent of the NAPL impacted soil). The incremental difference in capital cost for targeting 100 percent of the NAPL impacted soil versus 52 percent is $11.05 million or a 33 percent increase in capital cost to proceed from Scenario 1 to Scenario 3. The unit capital cost for targeting NAPL impacted soil ranges from $15 per cubic yard (Scenario 3) to $22 per cubic yard (Scenario 1). Based on SteamTech's analysis of equipment types and capacity, the capital cost estimates primarily reflect differences in the quantity of wells or piping for a scenario, as well as differences in model selection or capacities for major equipment and appurtenances. Further, the three scenarios reflect SteamTech's assumptions regarding system expansions required to treat 52 percent of the NAPL impacted soil versus 100 percent. No significant changes in approach, processing equipment types, or treatment technologies are indicated for the three thermal scenarios.

4.1.2 O&M Costs

The O&M costs (Year 1) for the thermal treatment scenarios range from $10.31 million (Scenario 1) to $17.61 million (Scenario 3). During Year 1, the incremental difference in annual O&M costs for targeting 100 percent of the NAPL impacted soil versus 52 percent is $7.30 million or a 71 percent increase in annual O&M cost to proceed from Scenario 1 to Scenario 3. The unit O&M cost for targeting NAPL impacted soil ranges from $25 per cubic yard (Scenario 3) to $31 per cubic yard (Scenario 1). During the cool-down period (years 5, 6 and 7), annual O&M costs do not vary significantly between the three scenarios ($2.92 to $3.33 million per year, excluding demolition costs in Year 7).

4.1.3 Periodic Costs

The periodic costs anticipated for the three thermal treatment scenarios do not differ much as the amount of NAPL impacted soil targeted by a scenario increases. The estimates differ largely in the numbers of wells/pumps replaced and estimated system demolition costs, with similar periodic reporting/administrative costs expected for each scenario. Assuming that no significant process equipment repair and replacement costs are incurred in the 7 years of thermal treatment and cool-down, there is little difference in the periodic costs for each alternative.

4.1.4 Life Cycle Cost and Present Value

The life cycle costs for the three thermal treatment scenarios range from $83.17 million (Scenario 1) to $118.62 million (Scenario 3). The difference in life cycle cost for targeting 100 percent of the NAPL impacted soil versus 52 percent is $35.45 million or a 43 percent increase in life cycle cost to proceed from Scenario 1 to Scenario 3. The present value of the three scenarios range from $71.50 million to $103.27 million. Since the timing of expenditures is identical for the three scenarios, present value is not a useful tool for cost comparisons.

4.2 GROUNDWATER PUMP-AND-TREAT COSTS

4.2.1 Capital Costs

URS performed an independent evaluation of the capital costs to construct the groundwater pump-and-treat system described by ICF Kaiser in the McCormick and Baxter site's feasibility study (USEPA 1998). Assuming a 30-year analysis period, the capital cost developed by each company is expected to be comparable in terms of assumptions regarding user-life of equipment, construction quality, and location-specific cost adjustments.

ICF Kaiser estimated that the capital cost, in 1998 dollars, to implement the selected groundwater pump-and-treat remedy (Groundwater Treatment Alternative GW-4, Hydraulic Containment and NAPL Removal) would be $2.67 million. To update ICF Kaiser's value to an equivalent 2001 basis, URS consulted several sources for inflation indexes, including the Bureau of Labor Statistics (http://stats.bls.gov) Consumer Price Index and Gross Domestic Product Index. A historical construction cost index developed by RS Means (Facility Construction Cost Data 2000; data for 2001 is not currently available) was also consulted. Based on these sources, an adjustment factor of 1.06 was used to convert ICF Kaiser's estimate to 2001 dollars, or a current value of $2.83 million. For cost comparisons, the 1998 values were left unchanged in Table 4-1.

URS' independent estimate of 2001 capital costs, based on ICF Kaiser's description of the groundwater pump-and-treat system, is $10.97 million. URS' assumptions regarding the wellfield design (number and depths of wells), the treatment processes, and flow rates are based on ICF Kaiser's evaluation (USEPA 1998). However, the 1998 evaluation provided a limited and non-specific description of ICF Kaiser's approach and the treatment processes reflected in their estimate. URS' assumptions therefore reflect inclusion of comparable processes, such as a fluidized bed bioreactor for the biological treatment unit (a fixed film bioreactor) described by ICF Kaiser (USEPA 1998), and our experience concerning required work activities, equipment, and accessories based on other projects. Additionally, URS assumes that a 30-year or 100-year period of operation results in periodic replacement of most or all of the major process equipment and structures of the pump-and-treat system. Differences in construction quality or equipment selection are not expected to result in any significant impact on the user-life of the system. Therefore, the capital costs to construct a pump-and-treat system for 30 or 100 years of operation and maintenance are considered the same. Periodic costs of repair and replacement vary for the two systems, as discussed separately.

The capital costs developed by ICF Kaiser (USEPA 1998) and URS are comparable in terms of their relative order of magnitude, but primarily differ due to the type and detail of estimate prepared. Additionally, the ICF Kaiser estimates did not include typical construction costs such as mobilization/demobilization, site work and temporary facilities, utility extensions and other improvements at the site, pre-mobilization submittals, and startup/commissioning costs. URS' bottom up approach provides a more complete and realistic allocation of costs for typical general conditions and pre-construction submittals associated with work on a Superfund site, completion of design and permitting requirements, accounting for the contractor's on-site and off-site costs, treatment plant construction costs, and startup/system commissioning.

4.2.2 O&M Costs

ICF Kaiser estimated that 1998 O&M costs for the pump-and-treat system would range between $0.90 million per year (Years 1 through 10) and $0.81 million per year (Years 11 through 30), for a cumulative O&M cost of $25.20 million over 30 years (USEPA 1998). The O&M activities included annual NAPL/groundwater monitoring, NPDES permit compliance sampling, recovered NAPL disposal, per-gallon costs for the biotreatment system, and replacement of GAC as it reached its adsorption capacity. System maintenance was allocated as 10 percent of the original system capital cost.

URS' independent O&M cost estimate, based on ICF Kaiser's description of the groundwater pump-and-treat system, is approximately $1.50 million per year. The cumulative O&M cost of 30 years of operation is $45.02 million; the cost of 100 years of operation is estimated to be

$149.61 million. A key assumption of the URS estimate is that the annual O&M cost remains unchanged over the 30- or 100-year period of system operation, with the exception of decreasing annual NAPL recovery and disposal over time. While it is possible that the first years of system operation may require a greater monitoring frequency and level of effort, the costs in later years of operation are as likely to decrease over the operating life of the system. URS based its estimate of average annual O&M efforts on guidance received from USACE regarding long-term monitoring of the thermal treatment scenarios, our experience with other pump-and-treat systems, and the ICF Kaiser estimate, which assumed no reduction in O&M effort as a function of time.

4.2.3 Periodic Costs

ICF Kaiser did not include periodic repair or replacement costs in their 1998 estimate (USEPA 1998). The estimates prepared by URS include periodic costs on 5-, 10-, and 20-year schedules, which reflect either a typical construction user-life (equipment and facilities) or expected cycles of data compilation and review. The major difference between the 30- and 100-year evaluation is the number of repair/replacement cycles.

4.2.4 Life Cycle Cost and Present Value

The life cycle costs for the pump-and-treat system ranges from $65.31 million (30 years of operation) to $194.85 million (100 years of operation). The difference in life cycle cost is $129.54 million or a 198 percent increase in life cycle cost to proceed from 30 to 100 years of operation. The present value of the pump-and-treat system ranges from $33.03 million for 30 years of operation to $36.28 million for 100 years of operation.

4.3 COST COMPARISONS FOR THERMAL AND PUMP-AND-TREAT SYSTEMS

4.3.1 Capital Cost

The capital costs of the three thermal treatment scenarios range from $33.58 to $44.63 million, versus $10.97 million for the pump-and-treat system.

4.3.2 O&M Costs

The O&M costs for the three thermal treatment scenarios range from a high of $10.31 to $17.61 million during the first year of active thermal treatment, decreasing to $2.92 to $3.31 million by the end of the 7-year operating period. O&M costs from Years 8 to 30 are

limited to groundwater monitoring activities. Cumulative O&M costs range from $47.83 to $72.06 million.

The groundwater pump-and-treat system is estimated to have an annual O&M cost of approximately $1.50 million. The cumulative O&M costs for 30- and 100-years of operation are estimated to be $45.02 million and $149.61 million, respectively.

4.3.3 Periodic Costs

The periodic costs for the thermal treatment scenarios range from $0.03 to $0.8 million over the 7 years of active thermal treatment and cool-down. Major repair and replacement costs are not incurred due to the relatively short operating life of the thermal treatment system and the NAPL/groundwater recovery system. The cumulative periodic costs over a 30-year operating life are estimated to be $1.76 to $1.93 million.

The pump-and-treat system has a continuing cycle of repair and replacement, resulting in significant costs for on-going construction activities over the life of the system. Periodic costs for the pump-and-treatment system range from less than $0.01 million to $4.08 million on 5- to 20-year cycles. The cumulative periodic costs for 30 and 100 years of operation are estimated to be $9.32 million and $34.28 million, respectively.

4.3.4 Life Cycle Cost and Present Value

The life cycle costs for the three thermal treatment scenarios range from $83.17 million (Scenario 1) to $118.62 million (Scenario 3). The life cycle costs for the pump-and-treat system ranges from $65.31 million (30 years of operation) to $194.85 million (100 years of operation). When comparing total remedy costs, the 100-year costs are considered more realistic than the 30-year costs, which were developed to allow a comparison with ICF Kaiser's 1998 estimates (USEPA 1998). The 100-year operating period is considered by EPA, USACE, and its advisory panel to be the minimum operational period feasible for this pump-and-treat system, while likely achieving minimal reduction in the contaminant mass present in the subsurface soil and groundwater. The life cycle costs for each of the three thermal scenarios are less than the costs to operate the pump-and-treat system for 100 years, while potentially addressing 52 to 100 percent of the known or suspected NAPL contaminated soil present in the McCormick and Baxter site.

The present values of the three thermal treatment scenarios range from $71.50 million to $103.27 million. The present value of the pump-and-treat system ranges from $33.03 million for 30 years of operation to $36.28 million for 100 years of operation. While the present value analysis is intended to allow a comparison of costs that occur over different time periods, it is

biased toward long-duration projects where capital and O&M costs are spread over time. The method assumes that present day dollars are dedicated now and grow in value to meet future expenses as incurred over the life of the project. The short duration of the thermal treatment scenarios, however, require significant funding levels in the early years of operation, followed by lower funding for the remainder of the operating period. Therefore, there is little opportunity to benefit from growth in the funds over time as a method for paying for the cleanup.

4.3.5 Unit Costs

The unit costs for thermal treatment predicted by this cost evaluation range from approximately $40 per cubic yard (Scenario 3—$118.62 million for 2.95 million cubic yards of NAPL-impacted soil) to $54 per cubic yard (Scenario 1—$83.17 million for 1.54 million cubic yards of NAPL-impacted soil). These costs are comparable to the unit cost of $39 per cubic yard of creosote-impacted soil for the Visalia Superfund Site (Visalia, California) reported by EPA (USEPA 2000b). The estimated unit costs also reflect good economies of scale. Compared to Scenario 1, Scenario 3 targets nearly double the quantity of impacted soil, while the unit treatment cost decreases by approximately 25 percent.

The pump-and-treat system estimates are based on treatment and discharge of approximately 123.5 million gallons per year. The unit cost for the McCormick and Baxter pump-and-treat system, based on first year O&M costs of $1.51 million, is $0.012 per gallon. These costs are within the range of costs documented by EPA (USEPA 2001b) for 32 pump-and-treat systems (adjusted to 2000 dollars). While these systems used a variety of physical, chemical, and biological treatment technologies, and therefore are not directly comparable to the McCormick and Baxter site assumptions, EPA's documented costs of treating comparable volumes of groundwater per year ranged from $0.003 to $0.030 per gallon.

Table 4-1
Life Cycle Costs and Present Value

Remedy Type	Capital Cost ($ million)	Annual O&M/ Total O&M ($ million)	Annual/Total Periodic Costs ($ million)	Life Cycle Cost and Present Value[a] ($ million)
Thermal Treatment (Steam and Electrical Resistance Heating)				
Scenario #1	$33.58	Year 1 - $10.31 Year 2 - $9.61[b] Year 3 - $7.52 Year 4 - $6.76 Year 5 - $2.92 Year 6 - $2.92 Year 7 - $4.86[c] Year 8 through 30 - $0.13[d] Total O&M, 30 Years - $47.83	Year 5 - $0.50 Year 10 - $0.20 Year 15 - $0.03 Year 20 - $0.20 Year 25 - $0.03 Year 30 - $0.80 Total Periodic Cost, 30 Years - $1.76	**$83.17 (LCC)** **$71.50 (PV)**
Scenario #2	$37.65	Year 1 - $13.95 Year 2 - $12.83[b] Year 3 - $10.03 Year 4 - $8.85 Year 5 - $3.13 Year 6 - $3.10 Year 7 - $5.04[c] Year 8 through 30 - $0.13[d] Total O&M, 30 Years - $59.88	Year 5 - $0.56 Year 10 - $0.20 Year 15 - $0.03 Year 20 - $0.20 Year 25 - $0.03 Year 30 - $0.80 Total Periodic Cost, 30 Years - $1.82	**$99.35 (LCC)** **$85.86 (PV)**
Scenario #3	$44.63	Year 1 - $17.61 Year 2 - $16.07[b] Year 3 - $12.56 Year 4 - $10.98 Year 5 - $3.33 Year 6 - $3.31 Year 7 - $5.25[c] Year 8 through 30 - $0.13[d] Total O&M, 30 Years - $72.06	Year 5 - $0.67 Year 10 - $0.20 Year 15 - $0.03 Year 20 - $0.20 Year 25 - $0.03 Year 30 - $0.80 Total Periodic Cost, 30 Years - $1.93	**$118.62 (LCC)** **$103.27 (PV)**

Table 4-1 (Continued)
Life Cycle Costs and Present Value

Remedy Type	Capital Cost ($ million)	Annual O&M/ Total O&M ($ million)	Annual/Total Periodic Costs ($ million)	Life Cycle Cost and Present Value[a] ($ million)
Groundwater Pump-and-Treat (Extraction for Hydraulic Containment and Control)				
1998 ICF Kaiser (30-year)	$2.66	Year 1 through 10 - $0.90 Year 11 through 30 - $0.81 Total O&M, 30 Years - $25.20	Not applicable; not included in ICF Kaiser estimate.	**$27.86 (LCC)** **$15.79 (PV)**
URS (30-year)	$10.97	Year 1 through 30 - $1.49 to $1.51 (varies with NAPL recovery; see Appendix D) Total O&M, 30 Years - $45.02	Year 5 - <$0.01 Year 10 - $1.61 Year 15 - $0.20 Year 20 - $5.69 Year 25 - $0.20 Year 30 - $1.61 Total Periodic Cost, 30 Years – $9.32	**$65.31 (LCC)** **$33.03 (PV)**
URS (100-year)	$10.97	Year 1 through 100 - $1.49 to $1.51 (varies with NAPL recovery; see Appendix D) Total O&M, 100 Years - $149.61	Year 5 - <$0.01 Year 10 - $1.61 Year 15 - $0.20 Year 20 - $5.69 Year 25 - $0.20 Year 30 - $1.61 Year 35 - $0.20 Year 40 - $5.69 Year 45 - $0.20 Year 50 - $1.61 Year 55 - $0.20 Year 60 - $5.69 Year 75 - $0.20 Year 80 - $5.69 Year 85 - $0.20 Year 90 - $1.61 Year 95 - $0.20 Year 100 - $1.85 Total Periodic Cost, 100 Years – $34.28	**$194.85 (LCC)** **$36.28 (PV)**

[a]Life cycle costs (LCC) include capital, O&M, and periodic costs. Present value (PV) is calculated using a 7 percent discount rate.
[b]ERH system demolition included in this year of operation and maintenance (O&M).
[c]Groundwater treatment system demolition included in this year of O&M.
[d]This phase of the work is limited to long-term monitoring of the site.

5.0 SENSITIVITY ANALYSIS

Sensitivity analysis measures the impact to project costs when one or more key cost values change. A number of key parameters have been selected for evaluation: duration of treatment, treated groundwater disposal method, energy costs, and patent fees. The impact of each parameter was measured by assessing the change in O&M costs or the life cycle cost for the thermal treatment scenarios and the groundwater pump-and-treat system. The trends from this analysis are shown in Table 5-1 and discussed below. In addition, the sensitivity of project costs to changes in timing or sequencing of treatment activities is evaluated.

5.1 DURATION OF TREATMENT

The total cost of the three thermal treatment scenarios is sensitive to the duration of active thermal treatment. Each additional year of active thermal treatment increases the total cost by approximately $6.76 to $10.98 million. This is an 8 to 9.2 percent increase in the life cycle cost of each thermal treatment scenario.

Extending the cool-down period by one-year result in additional costs of $2.92 to $3.31 million. This is a 2.8 to 3.5 percent in the life cycle cost of each thermal treatment scenario.

Each additional year of operation of the pump-and-treat system is $1.49 to 1.51 million. This is a 2.3 percent increase over the 30-year life cycle cost, but only a 0.8 percent increase in the 100-year life cycle cost.

In summary, the thermal treatment remedy is considered more sensitive than the pump-and-treat system to duration of treatment. However, the most aggressive thermal remedy (Scenario 3) could have active thermal treatment by steam injection for nearly 11 years (nearly three times its current operating period) before its life cycle cost approaches the expected costs of the 100-year pump-and-treat system.

5.2 TREATED GROUNDWATER DISPOSAL METHOD

The thermal treatment scenarios are based on groundwater extraction rates of 475 to 700 gallons per minute, or total volumes of 249.7 to 367.9 million gallons per year. The cost of treatment, based on allocation of Year 1 O&M costs (active thermal treatment) on a per gallon basis, ranges from $0.041 per gallon (Scenario 1) to $0.048 per gallon (Scenario 3). Treatment costs during

cool-down (Year 6 is used for comparison) range from $0.009 per gallons (Scenario 3) to $0.012 per gallons (Scenario 1).

Increased groundwater treatment costs during active thermal treatment have a greater impact on life cycle costs than during thermal cool-down. Table 5-1 shows that a 50 percent rise in O&M costs during active thermal treatment increases the life cycle costs of each scenario by 20.6 to 24.1 percent. A 50 percent increase in cool-down O&M costs result in a 4.2 to 5.3 percent increase in life cycle costs.

The groundwater pump-and-treat system is based on a surface discharge to Old Mormon Slough at 235 gallons per minute or 123.5 million gallons per year. The cost of treatment, based on allocation of Year 1 O&M costs on a per gallon basis, is $0.012 per gallon.

Increased groundwater treatment costs for the pump-and-treat system have a significant impact on life cycle costs. Table 5-1 shows that a 50 percent rise in O&M costs increases the life cycle costs of the 30-year and 100-year pump-and-treat operations by 34.5 and 38.4 percent, respectively. A 100 percent increase in pump-and-treat O&M costs result in a 68.9 percent increase in the life cycle cost of 30-years of operation and a 76.8 percent increase in the 100-year life cycle cost.

Preliminary discussions with the State of California have indicated that treated groundwater discharges to an existing public-owned treatment works (City of Stockton) or groundwater injection are preferred over a surface water discharge. The City of Stockton has indicated that their sewer system does not have the hydraulic capacity to handle the discharges expected for either the thermal or pump-and-treat remedies. If the City were capable of handling these flows, the equivalent cost per gallon as an industrial discharge (including surcharges for biological oxygen demand and suspended solids) is estimated to be $0.115 per gallon. This cost is an order-of-magnitude higher than the estimates for on-site groundwater treatment for the thermal cool-down period and the pump-and-treat system.

In summary, the pump-and-treat system is significantly more sensitive to increases in NAPL/groundwater treatment costs than the thermal treatment remedies. This is due to the significantly longer treatment periods (30 or 100 years) for the pump-and-treat system, compared to the 7-year operating period for the thermal treatment scenarios.

5.3 ENERGY COSTS

Energy for the thermal treatment scenarios is provided by natural gas and electricity. The natural gas is used in the boilers to produce steam for subsurface injection and for cogeneration of electricity using steam turbines during active thermal treatment. Electrical demand for the ERH system and operation of the NAPL groundwater treatment plant is potentially met by on-site electricity generation during the active thermal phase of NAPL/groundwater treatment. The thermal cost estimates assume that on-site electrical generation during the 4 years of active thermal treatment will meet these demands without significant purchases of electricity from commercial providers. After shut down of the steam injection process, electrical demands will be met by off-site electrical purchases during cool-down and long-term monitoring. The pump-and-treat system uses electricity purchased from off-site sources for its entire operating life.

The energy costs for the thermal and pump-and-treat remedies are based on U.S. Department of Energy forecasts of long-term natural gas and electricity rates, and assume that recent energy price fluctuations in California are not representative of local energy costs. Natural gas rates are assumed to be $3.50 per million BTUs, while electricity is benchmarked at $0.06 per kilowatt-hour (kW-hour).

Increases in natural gas costs to $7.00 per million BTUs and $10.00 per million BTUs were evaluated to determine their impact on life cycle costs of the thermal treatment scenarios. Historic highs of $14.20 per million BTUs occurred as recently as January 2001.

A doubling of natural gas costs ($7.00 per million BTUs) increases the life cycle costs of the thermal treatment scenarios by 24.7 to 34.6 percent. Increasing the natural gas rate to $10.00 per million BTUs would increase life cycle costs of the thermal remedies by 45.9 to 64.3 percent.

The pump-and-treat system is not directly affected by natural gas costs, as it is not used as a primary energy source. However, as natural gas is a common fuel for commercial power generators, the impacts of increased natural gas prices would be reflected in electrical rates.

Increases in electricity costs from $0.06 per kW-hour to $0.10 per kW-hour and $0.30 per kW-hour were evaluated to determine their impact on life cycle costs of the thermal treatment scenarios and the pump-and-treat system. Historic highs of $0.75 per kW-hour occurred as recently as December 2000.

An electrical rate of $0.10 per kW-hour increases the life cycle costs of the thermal treatment scenarios by 2.1 to 3.5 percent. An electrical rate of $0.30 per kW-hour increases life cycle costs of the thermal remedies by 12.6 to 16.1 percent. The impact of electrical rates on life cycle costs

is significantly moderated by the cogeneration of electricity at the site during the active thermal treatment phase (Years 1 through 4). Cogeneration is expected to meet the electrical demand of the ERH system (Years 1 and 2) and the NAPL/groundwater treatment system during the first 4 years of operations. During the cool-down phase, after shut down of the active thermal processes, electricity is purchased from off-site sources when on-site demand is significantly lower. Further, these off-site purchases are limited to three years of NAPL/groundwater treatment during cool-down. After shut down of those treatment systems, the electrical demands for the remainder of the 30-year operating period are low.

The pump-and-treat system is more sensitive to electrical rates because power is purchased entirely from off-site sources. An electrical rate of $0.10 per kW-hour increases the life cycle costs of the 30-year and 100-year pump-and-treat system by 3.7 and 4.1 percent, respectively. An electrical rate of $0.30 per kW-hour increases life cycle costs of the 30-year and 100-year pump-and-treat system by 21.9 and 24.5 percent, respectively.

Natural gas prices have the most direct impact on the life cycle costs of the thermal remedies; by cogenerating electricity during 4 years of the 7-year period of active treatment, the thermal remedies are not as directly impacted by electrical rates. However, at the highest gas price evaluated ($10.00 per million BTUs), the life cycle cost of thermal treatment Scenario 3 is approximately the same as the 100-year pump-and-treat systems' life cycle cost.

The pump-and-treat system is directly impacted by electrical costs, as power is purchased from off-site sources throughout its operating life; natural gas price impacts are indirect, as the costs are reflected in electrical rates from commercial power sources that use natural gas.

5.4 PATENT FEES

Groundwater pump-and-treat technologies are a commonly applied technique in the public domain, and are not subject to patent fees. The innovative technologies represented in the thermal treatment scenarios may be subject to patent fees, depending on which patents are determined to be applicable. These patents may include, but are not limited to, the following:

- Dynamic Underground Stripping, Patent No. 5,449,251 (Daily et al. 1995)
- Steam Enhanced Extraction, Patent No. 5,018,576 (Udell et al. 1991)
- Electrical Resistance Tomography, Patent No. 5,346,307 (Ramirez et al. 1994)
- Hydrous Pyrolysis/Oxidation Process, Patent No. 6,127,592 (Knauss et al. 2000)

The applicability of these patents or others has not been fully evaluated, nor the potential patent fees that may be incurred for use of these technologies at the McCormick & Baxter site. For purposes of the conceptual design estimates, a one-time cost of $100,000 for patent fees is included in the cost estimates for each of the thermal treatment scenarios. For Scenario 3, targeting 2.95 million cubic yards of NAPL-impacted soil, this is equivalent to a patent fee of $0.03 per cubic yard.

For comparative purposes, an increase of the per cubic yard fee was evaluated. Increasing the patent fee to $0.30 per cubic yard results in a one-time cost of $885,000, or a net increase in the life cycle cost of Scenario 3 of $785,000. If the patent fee is $1.00 per cubic yard, this is a one-time cost of $2.95 million for Scenario 3. The net increase in Scenario 3's life cycle cost is $2.85 million.

While questions remain concerning the applicability or value of patent fees, it does not appear that these fees will significantly affect the life cycle costs of the thermal or pump-and-treat remedies.

5.5 PHASING OF DESIGN, CONSTRUCTION, AND O&M ACTIVITIES

The thermal treatment cost estimates prepared for this document are based on design assumptions in a companion conceptual design document (USEPA 2001a). The conceptual design assumptions for thermal treatment Scenarios 1, 2, and 3 are based on an intensive period of design, construction, and thermal treatment, followed by a cool down period of groundwater and vapor extraction.

The estimates prepared for Scenarios 1, 2, and 3 (Appendices A, B, and C) also reflect a common estimating practice of excluding the design and permitting period from the construction and O&M timeline. This is due to the uncertain duration of decision-making, design, and bidding under the Superfund process, which could range from two to four years. Further, the 2-year construction period reflected in the allocation of labor is treated as a single expenditure in Year 0 of each estimate. As such, the estimates in Appendices A, B, and C compare active remediation costs as if they were incurred within a 7-year period, followed by 23 years of compliance monitoring, with all project-related expenditures ending in Year 30. Similar assumptions regarding the design and construction period are also used in the pump-and-treat estimate (Appendix D).

The sensitivity of project costs to changes in timing or sequencing of treatment activities has been evaluated by adjusting the estimate for Scenario 1 to a timeline that includes the design and

construction periods in the cost evaluation. Figure 5-1 is a graphic schedule for Scenario 1. Design activities start in 2003 and are completed in 2004, including bidding and award of the construction contract. This is followed by three years of procurement, construction, and treatment system commissioning (2005 to 2007). These activities are then followed by four years of thermal treatment and a three-year cool down period (2008 through 2014). Each treatment scenario's design, construction, active thermal treatment, and cool down activities would therefore occur in the first 12 years following EPA's decision to proceed with a thermal remedy for the McCormick and Baxter site. Monitoring of the site would continue through 2037, with final restoration occurring in 2038. Appendix E contains a cost estimate summary for this time-adjusted scenario. This approach, referred to as Scenario 1, Thermal Treatment by Area, has a life cycle cost of $83.17 million and a present value of $49.47 million (Year 2001 dollars) when based on the timeline in Figure 5-1.

The conceptual design discusses opportunities for executing the thermal treatment scenarios in phases that may more realistically reflect EPA's ability to fund the remedial actions for this site. These options included the following:

- Design and construction of the thermal treatment system over a longer period, rather than during an intensive 4-year period, would allow the project to proceed with lower initial impacts on EPA funds for remediation. This approach could adjust the schedules for well drilling, well field construction, and construction of the surface treatment and recovery systems for NAPL, groundwater, and vapors to spread the high initial construction costs over multiple years. This does not significantly affect life cycle costs, but the expenditure of funds over a longer period of time has benefits for budgeting and evaluating the present value of the project costs.

- A phased schedule of drilling and well construction, while conducting interim aquifer tests to improve steam injection and NAPL recovery, could result in refinement of the well field and treatment system design. This could result in construction and O&M cost reductions due to installation of fewer wells or smaller treatment systems, as well as providing an opportunity to carrying out a phased expansion across the site to target areas with the highest documented concentrations of NAPL.

- Design and construction of the thermal treatment system to target different depth zones (beginning in the D- and E-zone aquifers) and sequential addition of other shallower zones could reduce overall equipment sizes and energy costs for thermal treatment. This approach was expanded upon in the conceptual design

document to evaluate the potential impacts on well field and treatment system design.

This final option, which targets contamination by depth zone rather that targeting the entire mass of contamination within a geographic area of the McCormick and Baxter site, was evaluated as part of the sensitivity analysis. Figure 5-2 is a graphic schedule for this phased treatment scenario, referred to as Scenario 1, Thermal Treatment Phased by Depth Zone. Design occurs in 2003 and 2004, creating the basic infrastructure for phased expansion of treatment capacity in a four-step process. Step 1 construction (2005 through 2006) focuses on protection of the drinking water aquifer (the E-zone aquifer) by thermal treatment (steam injection and ERH), with extraction from the D- and E-zone aquifers. This phase of the treatment (Step 1) would occur for 3 years (2007 through 2009), during which additional wells are constructed that target the D aquifer (2009). Step 2 would thermally treat the D and E aquifers for 3 years (2010 through 2012), with extraction from the C-, D-, and E-zone aquifers. Surface equipment for in situ thermal treatment and the extraction and treatment of NAPL, vapors, and groundwater would be sized for Step 2 treatment activities during the initial design.

The second period of design (2009 through 2010) and construction of a major treatment system expansion (2011 through 2012) would occur during Step 2 operations. The upgrades would be sized for Step 3 and 4 operations, with construction completed in 2012. Step 3 would expand thermal treatment into the C-, D-, and E-zone aquifers, with extraction from the A-, B-, C-, D-, and E-zone aquifers. Step 3 would thermally treat the target aquifers for 3 years (2013 through 2015), during which additional wells are constructed for Step 4 operations (2015). During Step 4 (2016 through 2018), thermal treatment and extraction would occur in the A-, B-, C-, D-, and E-zone aquifers.

Design and construction of the surface components of the thermal treatment system would occur in two major increments: the initial system sized for Step 1 and 2 operations (constructed in 2005/2006) and an upgrade for Step 3 and 4 operations (constructed in 2011/2012). Thermal treatment and extraction in one or more aquifers would begin in 2007 and continue through 2018, or a total of 12 years. Thermal treatment would be followed by a 3-year cool down period (2019 to 2021). This approach would require 19 years to proceed from design through shutdown of the active treatment systems. Long-term monitoring would begin in 2007 and continue through 2036. Final restoration occurs in 2037.

The cost estimate for Scenario 1, Thermal Treatment Phased by Depth Zone, is contained in Appendix F. This approach has a life cycle cost of $107.45 million, and a present value of $52.52 million (Year 2001 dollars).

The costs for Scenario 1, comparing thermal treatment by area versus treatment phased by depth zone, are summarized in Table 5-2. Comparisons of yearly costs, life cycle costs, and the present values of the two approaches indicate the following:

- Phasing of design, construction, and operations by depth zone can reduce the initial budgetary impacts of design and construction expenditures. The capital and O&M cost for any single year of operation under the depth-phased approach are typically lower than comparable activities in the area-based scenario.

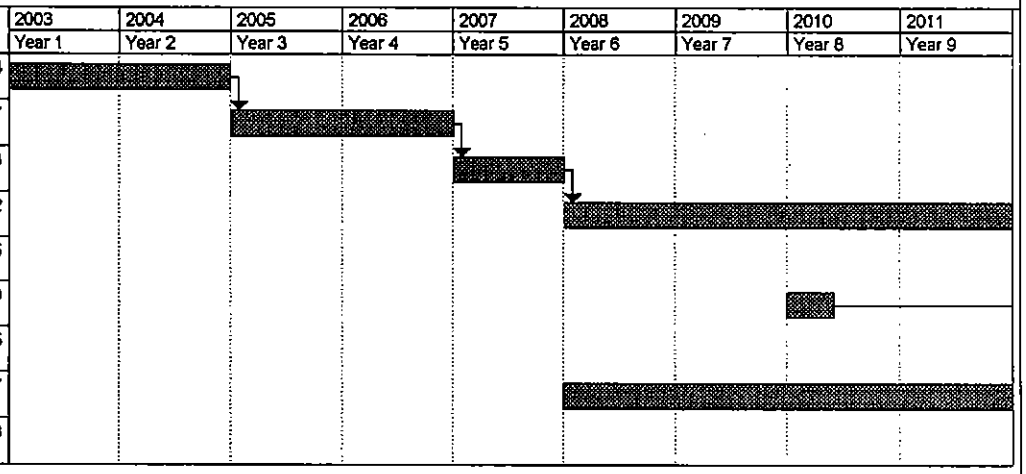
- Phasing by depth zone allows for incremental sizing of equipment according to the mass of soil and groundwater undergoing active treatment. The final treatment system capacities for the depth-phased approach are probably less than required for the area-based approach. However, the construction costs for retrofitting the treatment system for the large capacity increase from Step 2 to 3 is expected to require duplication of key system components (side-by-side construction to add capacity) to allow operation during the construction period. Additionally, lower productivity rates are expected to increase construction costs, as this major system rehabilitation is occurring during active treatment operations. Labor allocations for superintendence and general conditions over 6 years of construction, versus 2 years for the area-related scenario, have a significant impact on cumulative costs. Capital costs for the initial system (Step 1 and 2) and the subsequent upgrade for Step 3 and 4 are estimated to be $38.87 million, compared to $35.02 million for the aggressive area-based scenario.

- Phasing by depth increased the period of active treatment (thermal treatment and cool down) from 7 years to 15 years. This increases the costs for project superintendence and O&M labor, the maintenance periods for equipment and wells, and requires inclusion of additional periodic costs for well and equipment replacement that are not necessary for the area-based scenario.

- Phasing by depth increases the overall life cycle cost of the project, as design, construction, and active treatment costs are incurred over longer or multiple periods. However, the overall period in which costs are incurred remains comparable (completion of all site activities by 2037 or 2038), and does not result in a significant change in the calculated present value of the project costs.

Figure 5-1: Scenario 1 - Thermal Treatment by Area (MPA and CPA)

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Scenario #1	Mon 1/3/05	Wed 1/3/07
3	Startup and Demobe	Thu 1/4/07	Thu 1/3/08
4	Thermal Treatment - Scenario #1	Fri 1/4/08	Mon 1/2/12
5	Subsurface Cool-down - Scenario #1	Tue 1/3/12	Fri 1/2/15
6	Demobilization of ERH Treatment System	Fri 1/1/10	Mon 5/31/10
7	Demobilization of Treatment Systems	Mon 1/5/15	Wed 6/3/15
8	Long-term Groundwater Monitoring (30 years)	Tue 1/1/08	Thu 12/31/37
9	Restore Site/Abandon Wells	Mon 1/4/38	Tue 6/1/38



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

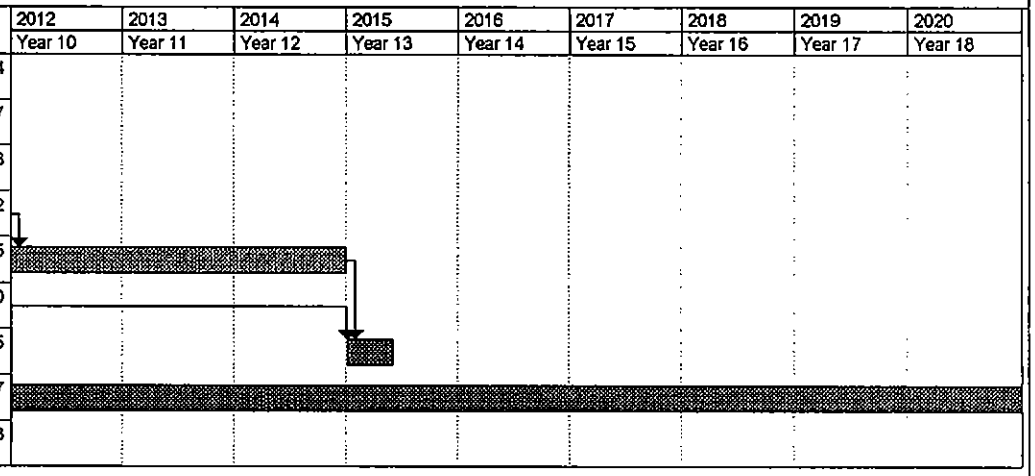
Thermal Scenario #1, Treatment by Area | Page 1 of 4 | Fri 11/9/01 3:32 PM

Figure 5-1
Thermal Treatment by Area (MPA and CPA)

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-1: Scenario 1 - Thermal Treatment by Area (MPA and CPA)

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Scenario #1	Mon 1/3/05	Wed 1/3/07
3	Startup and Demobe	Thu 1/4/07	Thu 1/3/08
4	Thermal Treatment - Scenario #1	Fri 1/4/08	Mon 1/2/12
5	Subsurface Cool-down - Scenario #1	Tue 1/3/12	Fri 1/2/15
6	Demobilization of ERH Treatment System	Fri 1/1/10	Mon 5/31/10
7	Demobilization of Treatment Systems	Mon 1/5/15	Wed 6/3/15
8	Long-term Groundwater Monitoring (30 years)	Tue 1/1/08	Thu 12/31/37
9	Restore Site/Abandon Wells	Mon 1/4/38	Tue 6/1/38



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

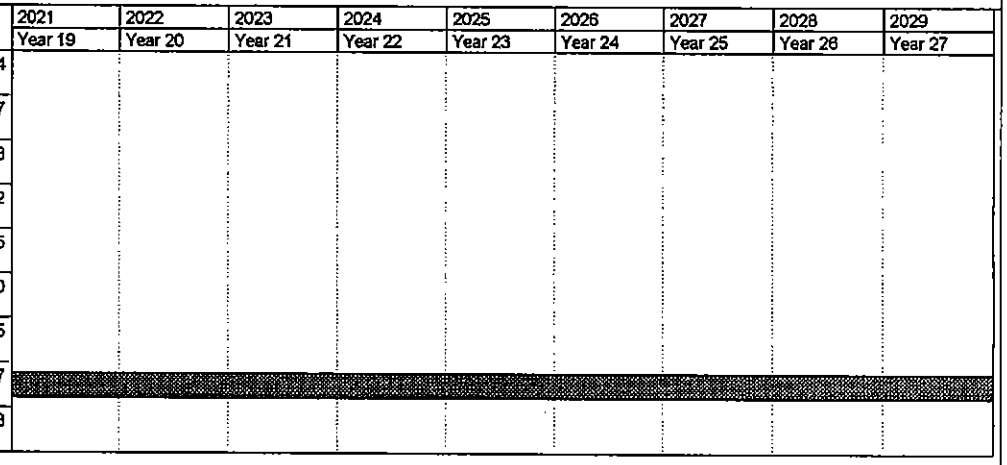
Thermal Scenario #1, Treatment by Area | Page 2 of 4 | Fri 11/9/01 3:32 PM

Figure 5-1 (continued)
Thermal Treatment by Area (MPA and CPA)

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-1: Scenario 1 - Thermal Treatment by Area (MPA and CPA)

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Scenario #1	Mon 1/3/05	Wed 1/3/07
3	Startup and Demobe	Thu 1/4/07	Thu 1/3/08
4	Thermal Treatment - Scenario #1	Fri 1/4/08	Mon 1/2/12
5	Subsurface Cool-down - Scenario #1	Tue 1/3/12	Fri 1/2/15
6	Demobilization of ERH Treatment System	Fri 1/1/10	Mon 5/31/10
7	Demobilization of Treatment Systems	Mon 1/5/15	Wed 6/3/15
8	Long-term Groundwater Monitoring (30 years)	Tue 1/1/08	Thu 12/31/37
9	Restore Site/Abandon Wells	Mon 1/4/38	Tue 6/1/38



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

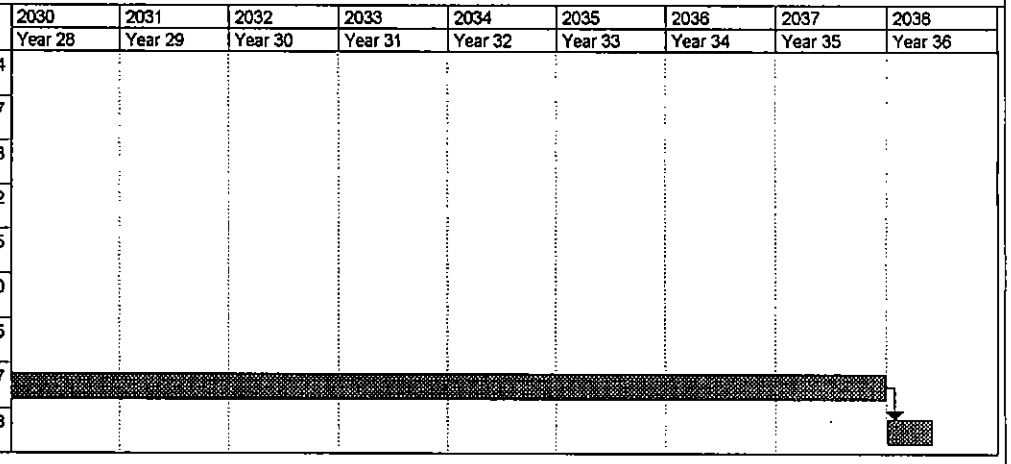
Thermal Scenario #1, Treatment by Area | Page 3 of 4 | Fri 11/9/01 3:32 PM

Figure 5-1 (continued)
Thermal Treatment by Area (MPA and CPA)

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-1: Scenario 1 - Thermal Treatment by Area (MPA and CPA)

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Scenario #1	Mon 1/3/05	Wed 1/3/07
3	Startup and Demobe	Thu 1/4/07	Thu 1/3/08
4	Thermal Treatment - Scenario #1	Fri 1/4/08	Mon 1/2/12
5	Subsurface Cool-down - Scenario #1	Tue 1/3/12	Fri 1/2/15
6	Demobilization of ERH Treatment System	Fri 1/1/10	Mon 5/31/10
7	Demobilization of Treatment Systems	Mon 1/5/15	Wed 6/3/15
8	Long-term Groundwater Monitoring (30 years)	Tue 1/1/08	Thu 12/31/37
9	Restore Site/Abandon Wells	Mon 1/4/38	Tue 6/1/38



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

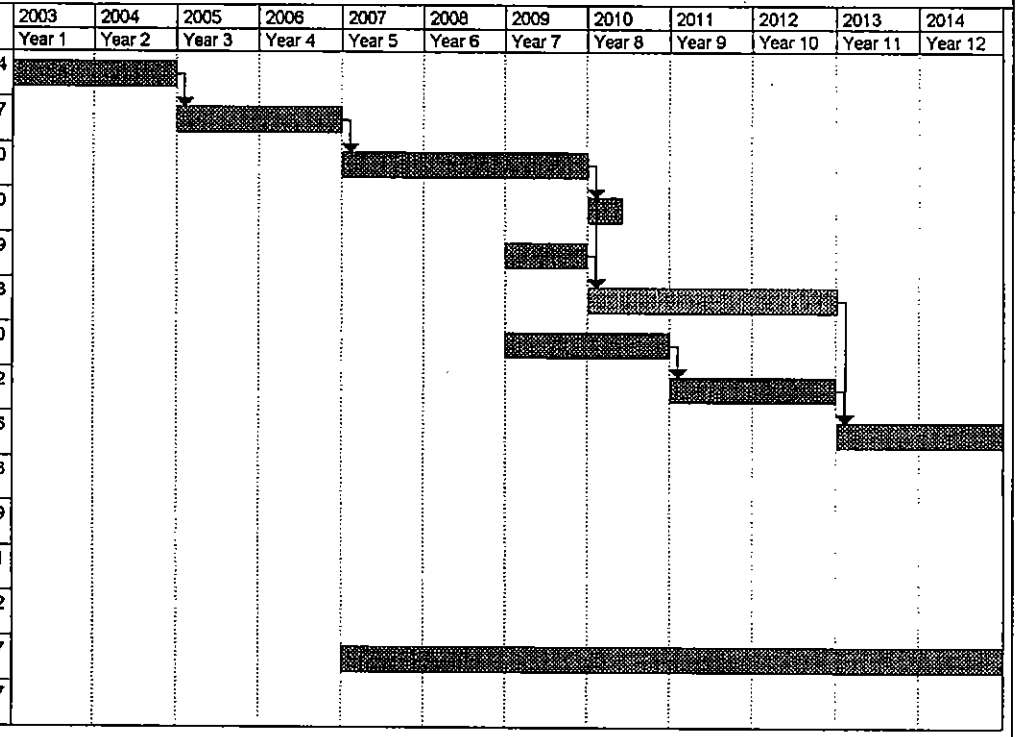
Thermal Scenario #1, Treatment by Area | Page 4 of 4 | Fri 11/9/01 3:32 PM

Figure 5-1 (continued)
Thermal Treatment by Area (MPA and CPA)

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-2: Scenario 1 - Thermal Treatment Phased by Depth Zone

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award - Step 1 & 2	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Step 1	Mon 1/3/05	Wed 1/3/07
3	Thermal Treatment - Step 1	Thu 1/4/07	Tue 1/5/10
4	Demobilization of ERS Treatment System	Wed 1/6/10	Mon 6/7/10
5	Procurement, Mobilization, Construction - Step 2	Thu 1/1/09	Thu 12/31/09
6	Thermal Treatment - Step 2	Wed 1/6/10	Mon 1/7/13
7	Design, Bidding & Contract Award - Step 3 & 4	Thu 1/1/09	Fri 12/31/10
8	Procurement, Mobilization, Construction - Step 3	Mon 1/3/11	Mon 12/31/12
9	Thermal Treatment - Step 3	Tue 1/8/13	Thu 1/7/16
10	Procurement, Mobilization, Construction - Step 4	Thu 1/1/15	Fri 1/1/16
11	Thermal Treatment - Step 4	Fri 1/8/16	Tue 1/8/19
12	Subsurface Cool-down Period	Wed 1/9/19	Fri 12/31/21
13	Demobilization of Treatment Systems	Mon 1/3/22	Thu 6/2/22
14	Long-term Groundwater Monitoring (30 years)	Mon 1/1/07	Thu 1/1/37
15	Restore Site/Abandon Wells	Fri 1/2/37	Tue 6/2/37



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

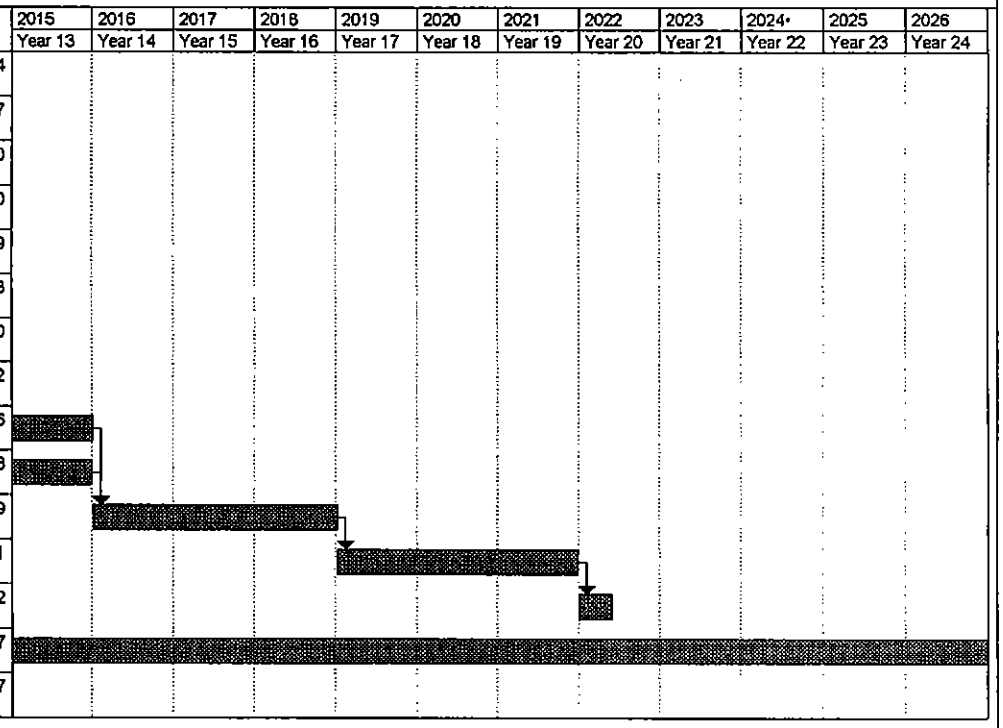
Thermal Scenario #1, Treatment Phased by Depth | Page 1 of 3 | Fri 11/9/01 3:33 PM

Figure 5-2
Thermal Treatment Phased by Depth Zone

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-2: Scenario 1 - Thermal Treatment Phased by Depth Zone

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award - Step 1 & 2	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Step 1	Mon 1/3/05	Wed 1/3/07
3	Thermal Treatment - Step 1	Thu 1/4/07	Tue 1/5/10
4	Demobilization of ERS Treatment System	Wed 1/6/10	Mon 6/7/10
5	Procurement, Mobilization, Construction - Step 2	Thu 1/1/09	Thu 12/31/09
6	Thermal Treatment - Step 2	Wed 1/6/10	Mon 1/7/13
7	Design, Bidding & Contract Award - Step 3 & 4	Thu 1/1/09	Fri 12/31/10
8	Procurement, Mobilization, Construction - Step 3	Mon 1/3/11	Mon 12/31/12
9	Thermal Treatment - Step 3	Tue 1/8/13	Thu 1/7/16
10	Procurement, Mobilization, Construction - Step 4	Thu 1/1/15	Fri 1/1/16
11	Thermal Treatment - Step 4	Fri 1/8/16	Tue 1/8/19
12	Subsurface Cool-down Period	Wed 1/9/19	Fri 12/31/21
13	Demobilization of Treatment Systems	Mon 1/3/22	Thu 6/2/22
14	Long-term Groundwater Monitoring (30 years)	Mon 1/1/07	Thu 1/1/37
15	Restore Site/Abandon Wells	Fri 1/2/37	Tue 6/2/37



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

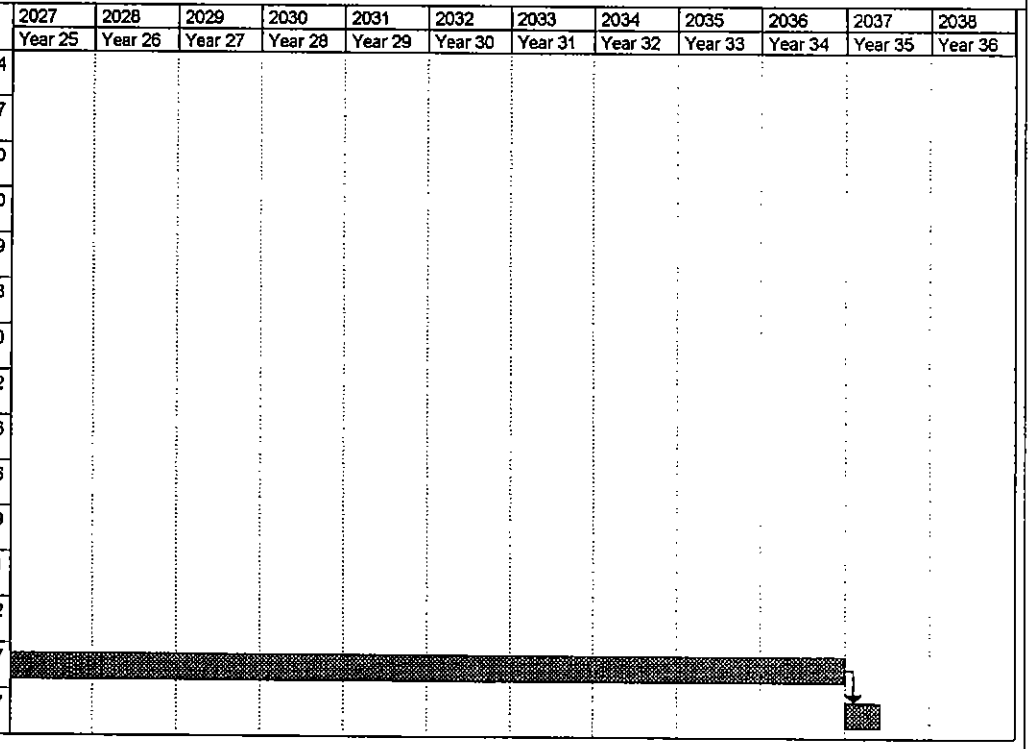
Thermal Scenario #1, Treatment Phased by Depth | Page 2 of 3 | Fri 11/9/01 3:33 PM

Figure 5-2 (continued)
Thermal Treatment Phased by Depth Zone

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Figure 5-2: Scenario 1 - Thermal Treatment Phased by Depth Zone

ID	Task Name	Start	Finish
1	Design, Bidding & Contract Award - Step 1 & 2	Wed 1/1/03	Fri 12/31/04
2	Procurement, Mobilization, Construction - Step 1	Mon 1/3/05	Wed 1/3/07
3	Thermal Treatment - Step 1	Thu 1/4/07	Tue 1/5/10
4	Demobilization of ERS Treatment System	Wed 1/6/10	Mon 6/7/10
5	Procurement, Mobilization, Construction - Step 2	Thu 1/1/09	Thu 12/31/09
6	Thermal Treatment - Step 2	Wed 1/6/10	Mon 1/7/13
7	Design, Bidding & Contract Award - Step 3 & 4	Thu 1/1/09	Fri 12/31/10
8	Procurement, Mobilization, Construction - Step 3	Mon 1/3/11	Mon 12/31/12
9	Thermal Treatment - Step 3	Tue 1/8/13	Thu 1/7/16
10	Procurement, Mobilization, Construction - Step 4	Thu 1/1/15	Fri 1/1/16
11	Thermal Treatment - Step 4	Fri 1/8/16	Tue 1/8/19
12	Subsurface Cool-down Period	Wed 1/9/19	Fri 12/31/21
13	Demobilization of Treatment Systems	Mon 1/3/22	Thu 6/2/22
14	Long-term Groundwater Monitoring (30 years)	Mon 1/1/07	Thu 1/1/37
15	Restore Site/Abandon Wells	Fri 1/2/37	Tue 6/2/37



Project: Project Phasing Schedule - V1
Date: Fri 11/9/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

Thermal Scenario #1, Treatment Phased by Depth | Page 3 of 3 | Fri 11/9/01 3:33 PM

Figure 5-2 (continued)
Thermal Treatment Phased by Depth Zone

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN COST ESTIMATE
McCormick and Baxter Superfund Site
Stockton, California

Table 5-1
Sensitivity Analyses

Parameter Analyzed	Analysis Performed	Thermal Treatment Scenarios	Groundwater Pump-and-Treat System
Duration of Treatment	Extend active thermal treatment period by 1 year.	Increases total life cycle cost by $6.76 to $10.98 million (8.0 to 9.2 percent increase over base case life cycle cost)	Not applicable (N/A)
	Extend thermal cool-down period by 1 year.	Increases total life cycle cost by $2.92 to $3.31 million (2.8 to 3.5 percent increase over base case life cycle cost)	N/A
	Extend groundwater pump-and-treat operation and maintenance (O&M) by 1 year.	N/A	Increases total life cycle cost by approximately $1.50 million • 2.3 percent increase over 30-year base case life cycle cost • 0.8 percent increase over 100-year base case life cycle cost
Treated Ground-water Disposal Method	Cost per gallon for water treatment during active thermal treatment; increase the O&M cost by 50 percent.	Cost per gallon of treated water ranges from $0.041 to $0.048 per gallon (Scenarios 1 and 3, respectively). A 50 percent increase in the active thermal treatment O&M cost impacts the life cycle costs as follow: • Scenario 1, $100.27 million (20.6 percent increase over the base case). • Scenario 3, $147.23 million (24.1 percent increase over the base case).	N/A

Table 5-1 (Continued)
Sensitivity Analyses

Parameter Analyzed	Analysis Performed	Thermal Treatment Scenarios	Groundwater Pump-and-Treat System
Treated Ground-water Disposal Method (cont.)	Cost per gallon for water treatment during thermal cool-down; increase the O&M cost by 50 percent.	Cost per gallon of treated water ranges from $0.009 to $0.012 per gallons (Scenarios 3 and 1, respectively). A 50 percent increase in the thermal cool-down treatment O&M cost impacts the life cycle costs as follow: • Scenario 1, $87.55 million (5.3 percent increase over the base case). • Scenario 3, $123.60 million (4.2 percent increase over the base case).	N/A
	Cost per gallon for pump-and-treat system; increase the O&M cost by 50 percent and 100 percent.	N/A	Cost per gallon of treated water is $0.012 per gallons (base case). A 50 percent increase in the pump-and-treat O&M cost impacts the life cycle costs as follows: • $87.82 million for 30 years (34.5 percent increase over the base case). • $269.67 million for 100 years (38.4 percent increase over the base case).

Table 5-1 (Continued)
Sensitivity Analyses

Parameter Analyzed	Analysis Performed	Thermal Treatment Scenarios	Groundwater Pump-and-Treat System
Treated Ground-water Disposal Method (cont.)		N/A	A 100 percent increase in the pump-and-treat O&M cost impacts the life cycle costs as follows: • $110.33 million for 30 years (68.9 percent increase over the base case). • $344.47 million for 100 years (76.8 percent increase over the base case).
Energy Costs: • Natural Gas	Increase natural gas rate from $3.50 per million British thermal units (BTUs) to $7.00 and $10.00 per million BTUs, respectively (historic high of $14.20 per million BTUs occurred in January 2001, Sumas, WA gas trading hub). Assumes co-generation of electricity during steam generation (Years 1 – 4).	Increasing the natural gas rate to $7.00 per million BTUs impacts the life cycle costs as follows: • Scenario 1, $103.72 million (24.7 percent increase over the base case). • Scenario 3, $159.70 million (34.6 percent increase over the base case). Increasing the natural gas rate to $10.00 per million BTUs impacts the life cycle costs as follows: • Scenario 1, $121.34 million (45.9 percent increase over the base case). • Scenario 3, $194.91 million (64.3 percent increase over the base case).	N/A

Table 5-1 (Continued)
Sensitivity Analyses

Parameter Analyzed	Analysis Performed	Thermal Treatment Scenarios	Groundwater Pump-and-Treat System
Energy Costs (cont.) • Electricity	Increase electrical costs from $0.06 per kilowatt-hour (kW-hour) to $0.10 and $0.30 per kW-hour, respectively (historical high of $0.75 per kW-hour occurred in December 2000, Mid-Columbia wholesale market). For the thermal treatment scenarios, assume cogeneration of electricity during steam generation (Years 1 – 4), then purchase of electricity from offsite sources. The pump-and-treat system obtains its electricity from offsite sources.	Increasing the electrical rate to $0.10 kW-hour impacts the life cycle costs of thermal treatment as follows: • Scenario 1, $84.92 million (2.1 percent increase over the base case). • Scenario 3, $122.80 million (3.5 percent increase over the base case). Increasing the electrical rate to $0.30 kW-hour impacts the life cycle costs of thermal treatment as follows: • Scenario 1, $93.66 million (12.6 percent increase over the base case). • Scenario 3, $137.75 million (16.1 percent increase over the base case).	Increasing the electrical rate to $0.10 kW-hour impacts the life cycle costs of pump-and-treat as follows: • $67.69 million for 30 years (3.7 percent increase over the base case). • $202.79 million for 100 years (4.1 percent increase over the base case). Increasing the electrical rate to $0.30 kW-hour impacts the life cycle costs of pump-and-treat as follows: • $79.60 million for 30 years (21.9 percent increase over the base case). • $242.49 million for 100 years (24.5 percent increase over the base case).
Patent Fees	Patent fee applicability and values are not determined at this time; allocation of $100,000 was made in thermal treatment cost estimates. For Scenario #3, this represents a patent cost of $0.03 per cubic yard of NAPL impacted soil (2.95 million cubic yards). Evaluate cost impact of patent fees of $0.30 and $1.00 per cubic yard.	Current cost allocation is $100,000 (patent fee of $0.03 per cubic yard). Increasing the patent fee to $0.30 per cubic yard is a one-time cost of $885,000; the net increase to total life cycle cost is $785,000. Increasing the patent fee to $1.00 per cubic yard is a one-time cost of $2.95 million; the net increase to total life cycle cost is $2.85 million.	No impact on groundwater pump-and-treat system; patent fees are not applicable.

Table 5-1 (Continued)
Sensitivity Analyses

Parameter Analyzed	Analysis Performed	Thermal Treatment Scenarios	Groundwater Pump-and-Treat System
Patent Fees	Patent fee applicability and values are not determined at this time; allocation of $100,000 was made in thermal treatment cost estimates. For Scenario #3, this represents a patent cost of $0.03 per cubic yard of NAPL impacted soil (2.95 million cubic yards). Evaluate cost impact of patent fees of $0.30 and $1.00 per cubic yard.	Current cost allocation is $100,000 (patent fee of $0.03 per cubic yard). Increasing the patent fee to $0.30 per cubic yard is a one-time cost of $885,000; the net increase to total life cycle cost is $785,000. Increasing the patent fee to $1.00 per cubic yard is a one-time cost of $2.95 million; the net increase to total life cycle cost is $2.85 million.	No impact on groundwater pump-and-treat system; patent fees are not applicable.

Table 5-2
Cost Comparison of Thermal Treatment by Area (MPA and CPA) and Phased by Depth Zone, Scenario 1

	Thermal Treatment by Area (MPA and CPA)						Thermal Treatment Phased by Depth Zone					
Calendar Year	Activity	Design/Bid ($)	Capital Cost ($)	Annual O&M Cost ($)	Periodic Cost ($)	Description	Activity	Design/Bid ($)	Capital Cost ($)	Annual O&M Cost ($)	Periodic Cost ($)	Description
2003	ENGINEERING	1,139,944	—	—	—	Design full-scale treatment system and well field	ENGINEERING & DESIGN	1,139,944	—	—	—	Design full-scale treatment system and well field
2004	ENGINEERING	1,139,944	—	—	—	Design full-scale treatment system and well field	ENGINEERING/ DESIGN/ CONTRACTING	1,139,944	—	—	—	Bid only Step 1 and 2 construction
2005	CONSTRUCTION	—	8,929,563	—	—	Procurement & construction	CONSTRUCTION STEP 1	—	8,621,901	—	—	Step 1 - target E aquifer
2006	CONSTRUCTION	—	13,955,053	—	—	Construction of well field and treatment system	CONSTRUCTION/ STARTUP STEP 1	—	6,252,918	—	—	Step 1 - target E aquifer
2007	STARTUP & DEMOBE	—	8,411,224	—	—	Construction & system commissioning	HEAT YEAR 1 STEP 1	—	—	4,409,334	—	Year 1 of thermal treatment - steam and ERH
2008	O&M STEAM INJECT YEAR 1	—		10,306,028	—	Year 1 of thermal treatment - steam and ERH	HEAT YEAR 2 STEP 1	—	—	3,525,700	—	Year 2 of thermal treatment - steam and ERH; demobilization of ERH at end of year
2009	O&M STEAM INJECT YEAR 2	—	—	9,608,333	—	Year 2 of thermal treatment - steam and ERH; demobilization of ERH at end of year	HEAT YEAR 3 STEP 1; CONSTRUCT STEP 2 WELLS	935,075	6,281,696	3,729,749	—	Year 3 of thermal treatment - steam
2010	O&M STEAM INJECT YEAR 3	—	—	7,521,201	—	Year 3 of thermal treatment - steam	HEAT YEAR 1 STEP 2	935,075	—	4,400,142	—	Year 4 of thermal treatment - steam
2011	O&M STEAM INJECT YEAR 4	—	—	6,756,122	1,500	Year 4 of thermal treatment - steam; update O&M plan	HEAT YEAR 2 STEP 2; ENGR/CONSTRUCT UPGRADE	—	3,100,128	3,745,290	—	Year 5 of thermal treatment - steam
2012	O&M COOL DOWN YEAR 5	—	496,000	2,918,822	5,000	Year 1 of cool down; 5-year review report, replace well extraction and sampling pumps	HEAT YEAR 3 STEP 2; CONSTRUCT UPGRADE	—	6,430,539	4,172,245	—	Year 6 of thermal treatment - steam
2013	O&M COOL DOWN YEAR 6	—	—	2,913,906	—	Year 2 of cool down	HEAT YEAR 1 STEP 3	—	25,000	5,956,434	5,000	Well pump replacement; Year 7 of thermal treatment - steam; 5-year review report
2014	O&M COOL DOWN YEAR 7	—	1,850,152	3,005,342	—	Year 3 of cool down; included demo of GWTP, piping and wells	HEAT YEAR 2 STEP 3	—	—	4,932,995	—	Year 8 of thermal treatment - steam
2015	O&M MONITORING WELLS	—		128,390	—	Long-term monitoring begins	HEAT YEAR 3 STEP 3; WELLS FOR STEP 4	—	4,388,109	5,139,313	—	Year 9 of thermal treatment - steam
2016	O&M MONITORING WELLS	—		128,390	—	Long-term monitoring	HEAT YEAR 1 STEP 4	—	—	5,510,848	—	Year 10 of thermal treatment - steam
2017	O&M MONITORING WELLS	—	25,000	128,390	5,000	Long-term monitoring; 5-year review report	HEAT YEAR 2 STEP 4	—	—	4,641,447	—	Year 11 of thermal treatment - steam
2018	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	HEAT YEAR 3 STEP 4	—	195,000	4,641,447	5,000	Year 12 of thermal treatment - steam
2019	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	COOL DOWN YEAR 1	—	—	2,589,655	—	Year 1 of cool down
2020	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	COOL DOWN YEAR 2	—	—	2,461,629	—	Year 2 of cool down
2021	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	COOL DOWN YEAR 3	—	—	2,553,189	—	Year 3 of cool down
2022	O&M MONITORING WELLS	—	25,000	128,390	5,000	Well pump replacement; long-term monitoring; 5-year review report	O&M MON. WELLS & DEMO TREATMENT SYSTEM	—	1,978,542	0	—	Demo GWTP; begin long-term monitoring

Table 5-2 (Continued)
Cost Comparison of Thermal Treatment by Area (MPA and CPA) and Phased by Depth Zone, Scenario 1

	Thermal Treatment by Area (MPA and CPA)						Thermal Treatment Phased by Depth Zone					
Calendar Year	Activity	Design/Bid ($)	Capital Cost ($)	Annual O&M Cost ($)	Periodic Cost ($)	Description	Activity	Design/Bid ($)	Capital Cost ($)	Annual O&M Cost ($)	Periodic Cost ($)	Description
2023	O&M MONITORING WELLS	—	170,000	128,390	—	Well repair/replacement; long-term monitoring	O&M MONITORING WELLS 1ST YEAR	—	400,000	128,390	5,000	Well pump replacement; long-term monitoring; 5-year review report
2024	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2025	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2026	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2027	O&M MONITORING WELLS	—	25,000	128,390	5,000	Well pump replacement; long-term monitoring; 5-year review report	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2028	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	195,000	128,390	5,000	Well repair/replacement; long-term monitoring; 5-year review report
2029	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2030	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2031	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2032	O&M MONITORING WELLS	—	25,000	128,390	5,000	Well pump replacement; long-term monitoring; 5-year review report	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2033	O&M MONITORING WELLS	—	170,000	128,390	—	Long-term monitoring; well repair/replacement	O&M MONITORING WELLS	—	400,000	128,390	5,000	Well pump replacement; long-term monitoring; 5-year review report
2034	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2035	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2036	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring
2037	O&M MONITORING WELLS	—	—	128,390	—	Long-term monitoring	FINAL REPORT, RESTORE SITE/ ABANDON WELLS	—	500,000	—	300,000	Demolition/site restoration; final report
2038	FINAL REPORT, RESTORE SITE/ ABANDON WELLS	—	500,000	—	300,000	Demolition/site restoration; final report						
	Subtotals	$ 2,279,888	$ 34,581,992	$ 45,982,724	$ 326,500		Subtotals	$ 4,150,038	$ 38,768,833	$ 64,206,877	$ 325,000	
	Total Life Cycle Cost: $83,171,104						Total Life Cycle Cost: $107,450,748					
	Present Value: $49,471,305						*Present Value: $52,524,614*					

Notes:
— - not applicable
ERH - electrical resistance heating
GWTP - groundwater treatment process

6.0 CONCLUSIONS

URS' observations regarding the estimated costs of the thermal treatment remedies (Scenarios 1, 2, and 3) and the pump-and-treat system are as follows:

- The life cycle costs of the three thermal treatment scenarios ($83.17 to $118.62 million) are less than the 100-year pump-and-treat system ($194.85 million). Based on discussions with EPA and USACE, the operating period of the pump-and-treat system could extend significantly beyond 100 years.

- The effectiveness of the thermal treatment remedies in reducing the mass of contaminant present in the McCormick and Baxter site is significantly higher than the long-term pump-and-treat system, which is primarily a containment and hydraulic control technology.

- While annual O&M costs for the thermal remedies are much higher than the pump-and-treat system, the differences in their life cycle cost allow the steam-treatment period to nearly triple before total costs approach those expected for the 100-year pump-and-treat system.

- Increases in the O&M costs for NAPL/groundwater treatment and discharge have a significantly greater impact on the life cycle cost of the pump-and-treat system than the three thermal treatment scenarios. This is due to the differences in the treatment/discharge period (100 years for the pump-and-treat system, 7 years for the thermal remedies). Resistance to a surface water discharge would likely require revising the pump-and-treat system to discharge groundwater by reinjection, which would result in additional capital and O&M costs.

- Significant increases in natural gas prices could increase the life cycle costs of the thermal remedy; however, a tripling of gas prices ($3.50 to $10.00 per million BTU) could be borne before their life cycle costs approach the costs expected for the 100-year pump-and-treat system. The pump-and-treat system is not directly affected by natural gas rates, as it is not a primary energy source, but would be reflected in electricity rates for its off-site power supply.

- Significant increases in electricity rates will have more direct impact on the 100-year pump-and-treat system's life cycle costs than the three thermal remedies.

Cogeneration of electricity during 4 years of the 7-year thermal treatment operations has a moderating effect on life cycle costs, while the pump-and-treat system is more vulnerable to significant swings in electrical rates over its 100 years of operation.

- Present value analyses indicate that the cost of the 100-year pump-and-treat system is significantly less than the thermal remedies. This reflects deferment of most of the pump-and-treat system's costs, as annual O&M, to the future and less initial financial commitment by EPA than the thermal remedies, which require a higher commitment of capital and O&M dollars during the first few years of active operation.

If the thermal treatment remedies result in the predicted reductions in contaminant mass and mobility, the life cycle cost comparisons indicate that the thermal remedies are more cost effective than the 100-year pump-and-treat system. Further, the ultimate costs of the pump-and-treat system are likely to exceed the 100-year operating scenario that was assumed for this evaluation. Present value analyses indicate that the pump-and-treat system can be financed more effectively than the thermal remedies, but do not reflect the significant differences in the quality of treatment, in terms of contaminant removal, and how soon the McCormick and Baxter site can be returned to productive use and redevelopment.

7.0 REFERENCES

Daily, W.D., A.L. Ramirez, R.L. Newmark, K. Udell, H.M. Beutnner, and R.D. Aines. 1995. *Dynamic Underground Stripping: Steam and Electric Heating for In Situ Decontamination of Soils and Groundwater.* U.S. Patent Number 5,449,251. September 12, 1995.

Knauss, K.G., S.C. Copenhaver, and R.D. Aines. 2000. *Hydrous Pyrolysis/Oxidation Process for In Situ Destruction of Chlorinated Hydrocarbon and Fuel Hydrocarbon Contaminants in Water and Soil.* U.S. Patent Number 6,127,592. October 3, 2000.

Ramirez, A.L., D.A. Chestnut, and W.D. Daily. 1994. *Using Electrical Resistance Tomography to Map Subsurface Temperatures.* U.S. Patent Number 5,346,307. September 13, 1994.

Udell, K.S., N. Sitar, J.R. Hunt, and L.D. Stewart, Jr. 1991. *Process for In Situ Decontamination of Subsurface Soil and Groundwater.* U.S. Patent Number 5,018,576. May 28, 1991.

U.S. Army Corps of Engineers (USACE). 2000. *1999 NAPL Field Investigation Report, McCormick and Baxter Superfund Site, Stockton, California.* June 2000.

U.S. Department of Energy (USDOE). 2000. Annual Energy Lookout 2001—Forecast Comparisons. USDOE Energy Information Administration Report No. DOE/EIA-0383. December 2000.

U.S. Environmental Protection Agency (USEPA). 2001a. *Thermal Treatment Technology Conceptual Design, McCormick and Baxter Superfund Site, Stockton, California.* Prepared by SteamTech, TRS, and URS. November 2001.

———. 2001b. *Remediation Technology Cost Compendium—Year 2000.* EPA-542-R-01-009. Office of Solid Waste and Emergency Response. September 2001.

———. 2000a. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study.* EPA-540-R-00-002/OSWER 9355.0-750. July 2000.

———. 2000b. *Abstracts of Remediation Case Studies.* Volume 4. EPA-542-R-00-006. Prepared by the Member Agencies of the Federal Technologies Roundtable. June 2000.

———. 1999. *Record of Decision, McCormick and Baxter Superfund Site, Stockton, California.* USEPA Region 9. March 1999.

———. 1998. *Soils and Groundwater Feasibility Study Report, McCormick and Baxter Superfund Site, Stockton, California.* Prepared by ICF Kaiser Engineers, Inc. July 1998.

APPENDIX A

Thermal Treatment Scenario #1—
MPA, CPA, and North-MPA

APPENDIX A-1

Cost Estimate Summary—
Scenario #1

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - THERMAL TREATMENT TECHNOLOGY
MAIN PROCESS AREA (MPA), CELLON PROCESS AREA (CPA), AND NORTH-MPA

SCENARIO 1 - MPA, CPA, N-MPA

CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:
MPA and CPA are historic sources of NAPL. N-MPA is under the slough. Scenario 1 contains 1.54 million cubic yards of impacted soil (52 percent of estimated volume of impacted soil). This scenario included thermal treatment by steam and electrical resistance heating; vapor and NAPL/groundwater extraction and treatment; treated water reinjection; and short- and long-term site monitoring for 30 years.

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300 CAPITAL COSTS					
3300.05 GENERAL CONDITIONS					
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1	JOB	1,540,060.00	1,540,060	6 months of procurement, 18 months of construction support.
3300.05.02 ADMINISTRATION HOME OFFICE	1	JOB	468,967.00	468,967	Management and cost control.
3300.05.03 PURCHASING	1	JOB	145,143.00	145,143	Procurement of equipment, materials, supplies, subcontractors.
3300.05.06 FIRST AID, FIRE, TRAFFIC & SECURITY	1	JOB	160,127.00	160,127	Includes 24-hour security.
3300.05.07 HEALTH & SAFETY	1	JOB	85,407.00	85,407	Equipment and supplies, site-specific training and medical.
3300.05.09 TEMPORARY CONSTRUCTION FACILITIES	1	JOB	139,225.00	139,225	Contractor's office and storage, utility connections.
3300.05.10 PROJECT UTILITIES	1	JOB	22,150.00	22,150	Service fees for construction period.
3300.05.15 PATENT FEES	1	JOB	117,183.00	117,183	Allocation of $100,000; fee structure has not been determined.
SUBTOTAL GENERAL CONDITIONS	**1**	**JOB**		**2,678,262**	
Scope Contingencies 5%				133,913	Risk associated with incomplete design.
SUBTOTAL				**2,812,175**	
Bid Contingencies 10%				281,218	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCLUDING CONTINGENCY				**3,093,393**	
3300.10 SUBMITTALS / IMPLEMENTATION PLANS					
3300.10.01 Construction Work Plan	1	EA	14,331.00	14,331	Work activities, sequence, and schedules.
3300.10.02 Contractors Quality Control Management Plan	1	EA	8,556.00	8,556	Quality control responsibility, procedures, and corrective action.
3300.10.03 Contractors Chemical Quality Control Plan	1	EA	16,141.00	16,141	Chemical quality control responsibility, controls, validation
3300.10.05 Regulatory Compliance Plan/Update	1	EA	45,643.00	45,643	Regulatory requirements, reporting, and compliance activities.
3300.10.06 Traffic Routing Plan	1	EA	2,319.00	2,319	Impact to W. Washington Street, internal traffic routing & safety.
3300.10.07 Site Health and Safety Plan	1	EA	13,834.00	13,834	Worker/visitor health and safety requirements, procedures.
3300.10.15 Performance Testing Plan	1	EA	12,566.00	12,566	Boiler source testing, emissions control system requirements.
3300.10.41 Subcontracting Plan	1	EA	2,811.00	2,811	Competitive and non-discriminatory policies and procedures.
3300.10.42 Environmental Protection Plan	1	EA	3,905.00	3,905	Site-specific policies and procedures.
3300.10.43 Correct/Emerg Contingency Action Plan	1	EA	3,591.00	3,591	Emergency response policies and procedures.
SUBTOTAL SUBMITTALS / IMPLEMENTATION PLANS	**1**	**JOB**		**123,697**	
Scope Contingencies 5%				6,185	Risk associated with incomplete design.
SUBTOTAL				**129,882**	
Bid Contingencies 5%				6,494	Risks associated with changed conditions after contract award.
TOTAL SUBMITTALS/IMPLEMENTATION PLANS INCL CONTINGENCY				**136,376**	
3300.12 ENGINEERING					
3300.12.10 Completion Design - Civil	1	JOB	215,804.00	215,804	Building structure, concrete, pipelines, utility extensions.
3300.12.15 Completion Design - Process	1	JOB	504,824.00	504,824	Wastewater treatment system, equipment, plant piping
3300.12.20 Completion Design - Electrical	1	JOB	114,968.00	114,968	Services, controls, lighting, instrumentation, motors.
3300.12.26 PCS Programming	1	JOB	35,937.00	35,937	Process control, programmable logic control, interfaces.
3300.12.32 Completion Design - Mechanical	1	JOB	75,208.00	75,208	Piping, instrumentation, HVAC, plumbing.
3300.12.37 Completion Design - Specialty Subcontractor	1	JOB	937,464.00	937,464	Steam and electrical resistance heating, instrumentation, controls.
SUBTOTAL ENGINEERING	**1**	**JOB**		**1,884,205**	
Scope Contingencies 10%				188,421	Risk associated with incomplete design.
SUBTOTAL				**2,072,626**	
Bid Contingencies 10%				207,263	Risks associated with changed conditions after contract award.
TOTAL ENGINEERING INCLUDING CONTINGENCY				**2,279,888**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300.15 MOBE, SITE WORK, TEMP FACILITIES					
3300.15.01 CLEAR SITE BRUSH	30	ACR	723.52	21,706	Site preparation for field activities.
3300.15.02 MOBE EQUIP & FACILITIES	1	JOB	1,505.00	1,505	Heavy equipment, personnel to project site.
3300.15.05 TEMPORARY FACILITIES	1	JOB	306,006.00	306,006	Trailers, utilities (water, sewer, electricity, gas, phones), paving.
3300.15.08 SIGNS, BARRICADES	1	JOB	93,223.00	93,223	Traffic, dust, erosion, and site cleaning.
3300.15.10 GRAVEL CAP	10.8	ACR	26,855.62	290,041	10.9 acres, 6-inch thick for site access, fugitive emissions control.
3300.15.15 ASPHALT CAP	4222	SY	26.07	110,068	0.9 acre, 4-inch thick for Cellon Process Area emission control.
3300.15.92 SURVEYS	1	JOB	33,983.00	33,983	Layout and construction control surveys.
3300.15.97 MEETINGS	2	EA	6,700.22	13,400	Preconstruction meeting, coordination meetings.
SUBTOTAL MOBE, SITE WORK, TEMP FACILITIES	**1**	**JOB**		**869,931**	
Scope Contingencies 10%				86,993	Risk associated with incomplete design.
SUBTOTAL				**956,924**	
Bid Contingencies 10%				95,692	Risks associated with changed conditions after contract award.
TOTAL MOBE, SITE WORK, TEMP FACILITIES INCL CONTINGENCY				**1,052,617**	
3300.20 TREATMENT SYSTEM CONSTRUCTION					
3300.20.01 TREATMENT PLANT BUILDING	1	JOB	457,399.00	457,399	Temporary (Sprung or Rubb type), 100 ft by 200 ft, concrete slab.
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1	JOB	4,597,977.71	4,597,978	Expedite fabrication, submittals, purchasing, shipping & install.
3300.20.07 WELL INSTRUMENTS/CONTROLS	1	JOB	2,414,917.76	2,414,918	Cables, vertical electrode arrays, instruments, and power supply.
3300.20.10 INSTALL WELLS	1	JOB	9,467,136.85	9,467,137	Extraction, injection wells, instrumentation, and pumps.
3300.20.15 PIPING	1	JOB	4,513,978.00	4,513,978	Steam, vapor, NAPL/groundwater, air piping, headers and laterals.
SUBTOTAL TREATMENT SYSTEM CONSTRUCTION	**1**	**JOB**		**21,451,409**	
Scope Contingencies 10%				2,145,141	Risk associated with incomplete design.
SUBTOTAL				**23,596,550**	
Bid Contingencies 10%				2,359,655	Risks associated with changed conditions after contract award.
TOTAL TREATMENT SYSTEM CONSTRUCTION INCL CONTINGENCY				**25,956,205**	
3300.25 STARTUP, TESTING, O&M MANUAL					
3300.25.05 O&M MANUAL	1	JOB	50,439.00	50,439	Operation and maintenance procedures and system control.
3300.25.10 STARTUP/COMMISSION TREATMENT SYSTEM	1	JOB	636,641.00	636,641	Startup, equipment shake-down, training and testing.
SUBTOTAL STARTUP, TESTING, O&M MANUAL	**1**	**JOB**		**687,080**	
Scope Contingencies 10%				68,708	Risk associated with incomplete design.
SUBTOTAL				**755,788**	
Bid Contingencies 10%				75,579	Risks associated with changed conditions after contract award.
TOTAL STARTUP, TESTING, O&M MANUAL INCL CONTINGENCY				**831,367**	
3300.30 DEMOBILIZATION					
3300.30.21 DEMOBILIZATION (CONSTRUCTION)	1	JOB	16,606.00	16,606	Remove construction equipment and personnel from site.
3300.30.22 REPORTS, CLOSEOUT	1	JOB	170,074.00	170,074	Closeout of chemical testing, health & safety, record drawings.
SUBTOTAL DEMOBILIZATION	**1**	**JOB**		**186,680**	
Scope Contingencies 10%				18,668	Risk associated with incomplete design.
SUBTOTAL				**205,348**	
Bid Contingencies 10%				20,535	Risks associated with changed conditions after contract award.
TOTAL DEMOBILIZATION INCLUDING CONTINGENCY				**225,883**	
TOTAL CAPITAL COSTS	**1**	**JOB**		**27,881,265**	
TOTAL CAPITAL COST, INCLUDING CONTINGENCY				**$ 33,575,728**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400 1ST YEAR O&M					
3400.05 GENERAL CONDITIONS					
3400.05.05 OFFSITE ADMINISTRATIVE COSTS	12	MO	10,164.14	121,970	Management, administration, procurement, and data analysis.
3400.05.10 ERH SYSTEM OP/REPORTING	12	MO	33,829.17	405,950	Process control and monitoring for ERH system.
3400.05.15 SITE SECURITY	12	MO	12,831.54	153,978	Site security and control, 24 hours per day.
SUBTOTAL GENERAL CONDITIONS				**681,898**	
Scope Contingencies 5%				34,095	Risk associated with incomplete design.
SUBTOTAL				**715,993**	
Bid Contingencies 5%				35,800	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCL CONTINGENCY				**751,793**	
3400.10 SITE FACILITIES	**12**	**MO**	**4,542.79**	**54,513**	Electrical, mechanical, and instrumentation support, facilities.
Scope Contingencies 5%				2,726	Risk associated with incomplete design.
SUBTOTAL				**57,239**	
Bid Contingencies 5%				2,862	Risks associated with changed conditions after contract award.
TOTAL SITE FACILITIES INCLUDING CONTINGENCY				**60,101**	
3400.15 HEALTH & SAFETY	**12**	**MO**	**925.75**	**11,109**	Personal protective equipment, health and safety monitoring.
Scope Contingencies 5%				555	Risk associated with incomplete design.
SUBTOTAL				**11,664**	
Bid Contingencies 5%				583	Risks associated with changed conditions after contract award.
TOTAL HEALTH & SAFETY INCLUDING CONTINGENCY				**12,248**	
3400.20 MATERIALS & SUPPLIES	**12**	**MO**	**351.55**	**4,219**	Routine maintenance supplies and materials.
Scope Contingencies 10%				422	Risk associated with incomplete design.
SUBTOTAL				**4,640**	
Bid Contingencies 10%				464	Risks associated with changed conditions after contract award.
TOTAL MATERIALS & SUPPLIES INCL CONTINGENCY				**5,105**	
3400.25 MAINTENANCE	**12**	**MO**	**7,820.01**	**93,840**	Parts, PLC and well maintenance, well redevelopment.
Scope Contingencies 10%				9,384	Risk associated with incomplete design.
SUBTOTAL				**103,224**	
Bid Contingencies 10%				10,322	Risks associated with changed conditions after contract award.
TOTAL MAINTENANCE INCL CONTINGENCY				**113,547**	
3400.30 UTILITIES	**12**	**MO**	**497483.78**	**5,969,805**	Electricity and natural gas purchase; co-generation credit, water.
Scope Contingencies 10%				596,981	Risk associated with incomplete design.
SUBTOTAL				**6,566,786**	
Bid Contingencies 10%				656,679	Risks associated with changed conditions after contract award.
TOTAL UTILITIES INCLUDING CONTINGENCY				**7,223,464**	
3400.35 SITE O&M LABOR & MISC EQUIPMENT	**12**	**MO**	**94,376.34**	**1,132,516**	Plant manager and operators, 3 shifts per day, 365 days per year.
Scope Contingencies 10%				113,252	Risk associated with incomplete design.
SUBTOTAL				**1,245,768**	
Bid Contingencies 10%				124,577	Risks associated with changed conditions after contract award.
TOTAL SITE O&M LABOR & MISC EQ INCL CONTINGENCY				**1,370,344**	
3400.40 CHEMICALS	**12**	**MO**	**8,527.02**	**102,324**	Granular activated carbon, water treatment chemicals.
Scope Contingencies 10%				10,232	Risk associated with incomplete design.
SUBTOTAL				**112,557**	
Bid Contingencies 10%				11,256	Risks associated with changed conditions after contract award.
TOTAL CHEMICALS INCLUDING OWNER CONTINGENCY				**123,812**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400.45 DISPOSALS					
3400.45.05 SLUDGE	12	MO	2,831.92	33,983	300 tons per year, offsite disposal.
3400.45.10 CARBON (GAC, VAPOR PHASE)	12	MO	507.79	6,093	Steam regeneration; offsite disposal of 10,000 pounds per year.
3400.45.15 CARBON (GAC, LIQUID PHASE)	12	MO	1,493.59	17,923	Steam regeneration; offsite disposal of 33,250 pounds per year.
3400.45.20 PPE & MISC	12	MO	195.31	2,344	Disposal allowance.
3400.45.25 OILY WASTE	12	MO	16,572.97	198,876	Average recovery, 85,714 gal/year; 600,000 gal over 7 years.
3400.45.30 WASTE MISC COSTS	12	MO	1,206.01	14,472	Tanks and liners, recurring waste handling and loadouts.
SUBTOTAL DISPOSALS				**273,691**	
Scope Contingencies 10%				27,369	Risk associated with incomplete design.
SUBTOTAL				**301,060**	
Bid Contingencies 10%				30,106	Risks associated with changed conditions after contract award.
TOTAL DISPOSALS INCLUDING CONTINGENCY				**331,166**	
3400.49 SAMPLING & ANALYSIS					
3400.49.05 PERFORMANCE MONITORING	12	MO	1,471.36	17,656	See Table 3-1 of Cost Estimate Report.
3400.49.10 COMPLIANCE MONITORING	12	MO	19,056.66	228,680	See Table 3-1 of Cost Estimate Report.
SUBTOTAL SAMPLING & ANALYSIS	**12**	**MO**		**246,336**	
Scope Contingencies 10%				24,634	Risk associated with incomplete design.
SUBTOTAL				**270,970**	
Bid Contingencies 5%				13,548	Risks associated with changed conditions after contract award.
TOTAL SAMPLING & ANALYSIS INCL CONTINGENCY				**284,518**	
3400.55 QC & ANALYTICAL DATA VALIDATION					
3400.55.05 DATA VALIDATION	12	MO	2,262.22	27,147	Validation of chemical data for air, water, and process control.
SUBTOTAL QC & ANALYTICAL DATA VALIDATION	**12**	**MO**		**27,147**	
Scope Contingencies 5%				1,357	Risk associated with incomplete design.
SUBTOTAL				**28,504**	
Bid Contingencies 5%				1,425	Risks associated with changed conditions after contract award.
TOTAL QC & ANALYTICAL DATA VALIDATION INCL CONTINGENCY				**29,929**	
TOTAL 1ST YEAR O&M	**12**	**MO**		**8,597,399**	
TOTAL 1ST YEAR O&M COST, INCLUDING CONTINGENCY				**$ 10,306,028**	

TOTAL McCORMICK & BAXTER SUPERFUND SITE SCENARIO 1

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Five Year Review Report	5	1	EA	5,000	5,000	1 report at end of Year 5
Update O&M Plan	5	1	EA	1,500	1,500	Update Plan
Five Year Review Report	10	1	EA	5,000	5,000	1 report at end of Year 10
Five Year Review Report	15	1	EA	5,000	5,000	1 report at end of Year 15
Five Year Review Report	20	1	EA	5,000	5,000	1 report at end of Year 20
Five Year Review Report	25	1	EA	5,000	5,000	1 report at end of Year 25
Remedial Action Report	30	1	EA	300,000	300,000	Final Report
Equipment Repairs/Replacement:						
Replace Well Extract/LoFlo Pumps	5	124	EA	4,000	496,000	Replacement during active treatment.
Replace Well LoFlo Pumps	10	25	EA	1,000	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	15	25	EA	1,000	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	20	25	EA	1,000	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	25	25	EA	1,000	25,000	Replacments during monitoring phase.
Well Repairs/Replacement:						
Replace Monitoring Wells	10	10	EA	17,000	170,000	Assume replace 10 wells every 10 yr.
Replace Monitoring Wells	20	10	EA	17,000	170,000	(Add 20K/event for demo/disposals)
Demolition/Restoration Site	30	1	JOB	500,000	500,000	<Includes removal of monitoring wells

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE	NOTES
Capital Cost	0	33,575,728	1.00000	33,575,728	
O&M STEAM INJECT YEAR 1	1	10,306,028	0.93458	9,631,802	
O&M STEAM INJECT YEAR 2	2	9,608,333	0.87344	8,392,290	<Includes demo ERH system
O&M STEAM INJECT YEAR 3	3	7,521,201	0.81630	6,139,540	
O&M STEAM INJECT YEAR 4	4	6,756,122	0.76290	5,154,213	
O&M COOL DOWN YEAR 5	5	2,918,822	0.71299	2,081,080	
O&M COOL DOWN YEAR 6	6	2,913,906	0.66634	1,941,659	
O&M COOL DOWN YEAR 7	7	4,855,494	0.62275	3,023,758	<Includes demo GWTP, piping & wells
O&M MONITORING WELLS	8 to 10	385,170	0.54393	209,507	at end of cool down phase.
O&M MONITORING WELLS	10 to 15	641,950	0.42924	275,552	Only monitoring wells remain.
O&M MONITORING WELLS	15 to 20	641,950	0.30604	196,465	
O&M MONITORING WELLS	20 to 25	641,950	0.21821	140,077	
O&M MONITORING WELLS	25 to 30	641,950	0.15558	99,873	
Periodic Cost	5	502,500	0.71299	358,276	
Periodic Cost	10	200,000	0.50835	101,670	
Periodic Cost	15	30,000	0.36245	10,873	
Periodic Cost	20	200,000	0.25842	51,684	
Periodic Cost	25	30,000	0.18425	5,527	
Periodic Cost	30	800,000	0.13137	105,094	Restore Site/Abandon Wells

TOTAL COSTS 30 YEARS	**$83,171,104**	
TOTAL PRESENT VALUE OF SCENARIO 1		**$ 71,494,667**

APPENDIX A-2

Costlink© Scenario #1—Capital Costs and Operation & Maintenance Estimate

McCORMICK & BAXTER SUPERFUND SITE
THERMAL TREATMENT

SCENARIO 1
CAPITAL COSTS & O&M

Designed By: URS Corporation
Estimated By: URS Staff

Prepared By: John E. Spear

Preparation Date: 10/27/01
Effective Date of Pricing: 07/13/01
Est Construction Time: 600 Days

Sales Tax: 0.0%

C o s t L i n k
Software Copyright (c) 1985-1998
by Building Systems Design, Inc.
Release 1.6c

CONTRACT DACA67-98-D-1005, DO #65 THERMAL TREATMENT TECHNOLOGY CONCEPTUAL DESIGN, COST ESTIMATION AND FOCUSED FEASIBILITY SUPPORT McCORMICK & BAXTER SUPERFUND SITE, STOCKTON, CALIFORNIA

SCENARIO 1, TREATMENT OF PRIORITY 1 SOILS ONLY INCLUDING:
MPA, CPA, & EAST PORTION OF N-MPA (IN OLD MORMON SLOUGH)

SUMMARY REPORTS SUMMARY PAGE

PROJECT INDIRECT SUMMARY - ACCOUNT.....1
PROJECT INDIRECT SUMMARY - SYSTEM.....2
PROJECT INDIRECT SUMMARY - SUBSYSTM.....7

DETAILED ESTIMATE DETAIL PAGE

3300. CAPITAL COSTS
05. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT.....1
02. ADMINISTRATION HOME OFFICE.....2
03. PURCHASING.....3
06. FIRST AID, FIRE, TRAFFIC, SECUR.....3
07. HEALTH & SAFETY.....3
09. TEMP CONSTRUCTION FACILITIES.....4
10. PROJECT UTILITIES.....6
15. PATENT FEES.....6
10. SUBMITTALS/IMPLEMENTATION PLANS
01. Construction Work Plan.....7
02. Contractors QC Management Plan.....7
03. Contractors Chem Quality Control.....8
05. Regulatory Compliance Plan/Updat.....8
06. Traffic Routing Plan.....9
07. Site Health and Safety Plan.....9
15. Performance Testing Plan.....10
41. Subcontracting Plan.....10
42. Environmental Protection Plan.....11
43. Correct/Emerg Conting Action Pln.....11
12. ENGINEERING
10. COMPLETION DESIGN - CIVIL.....13
15. COMPLETION DESIGN - PROCESS.....13
20. COMPLETION DESIGN - ELECTRICAL.....14
26. PCS PROGRAMMING - GROUNDWATER
15. PC PROGRAMMING.....14
20. MMI PROGRAMMING.....15
32. COMPLETION DESIGN - MECHANICAL.....15
37. COMPLETE DESIGN - SPECIALTY SUB.....16
15. MOBE, SITE WORK, TEMP FACILITIES
01. CLEAR SITE BRUSH.....17
02. MOBE EQUIP & FACILITIES.....17
05. TEMPORARY FACILITIES
20. TEMPORARY PAVING.....17
25. WATER LINE.....18
30. PHONE.....19
35. SEWER.....19
40. ELECTRICAL SERVICE.....20
45. GAS SERVICE.....20
08. SIGNS, BARRICADES
5. SIGNS.....21
10. BARRICADES/TEMP FENCING.....21
15. EROSION CONTROL.....22

DETAILED ESTIMATE DETAIL PAGE

20. STREET CLEANING....22
25. DUST CONTROL....22
10. GRAVEL CAP....23
15. ASPHALT CAP....23
92. SURVEYS
5. INITIAL LAYOUT SURVEY....23
10. SURVEY CONTROLS....23
97. MEETINGS
01. Preconstruction Meeting....24
03. Coordination Meeting....25
20. TREATMENT SYSTEM CONSTRUCTION
01. TREATMENT PLANT BUILDING....26
05. TREATMENT SYSTEM EQUIP. F&I
5. EXPEDITOR/QC EQUIP. FABRICATION....26
01. EQUIP SUBMITTAL REVIEW....26
10. EQUIPMENT PURCHASE/SHIPPING....27
12. INSTRUMENTATION/CONTROLLERS....29
13. COMPUTER....30
15. EQUIPMENT INSTALLATION....30
16. TREATMENT SYSTEM ELECTRICAL & IN....30
17. MECHANICAL....31
20. SPM 6Ph HEATING COMPONENTS....31
25. VEA & DPT COMPONENTS....32
07. WELL INSTRUMENTS/CONTROLS
10. INSTRUMENT CABLE TO WELLHEADS....32
30. WELL INSTRUMENTATION....33
35. VERTICAL ELECTRODE ARRAYS....33
40. ELECTRICAL POWER TO WELLS....34
10. INSTALL WELLS
5. EXTRACTION WELLS THERMAL....34
10. STEAM INJECTION WELLS....37
15. REINJECTION WELLS....38
20. MONITORING WELLS....39
25. TREAT WELL DRILL LIQUIDS/CUTTING....41
30. ANALYTICALS SOILS....41
35. ANALYTICALS LIQUIDS....42
40. LABOR & ODC's....42
15. PIPING
5. VAPOR RECOVERY SYSTEM....44
10. LIQUID RECOVERY SYSTEM....46
11. EXTRACTION WELLHEAD SPOOL/FTG....47
15. STEAM INJECTION SYSTEM....47
20. H2O REINJECTION SYSTEM....50
25. STEAM GENERATION SYSTEM....51
30. WATER TREATMENT SYSTEM....51
35. AIR PIPING....52
25. START UP, TESTING, O&M PLAN
5. O&M MANUAL
10. PCS Commissioning Manual....54
13. Preliminary Draft - O&M Manual....54
18. Revised Draft - O&M Manual....55

DETAILED ESTIMATE DETAIL PAGE

23. Final - O&M Manual....55
10. STARTUP/COMMISSION TREATMENT SYS
5. ENGINEERS & TECHNICIANS....56
10. TRAVEL & PER DIEM....58
15. EQUIPMENT/SUPPLIES....58
25. UTILITIES/SITE FACILITIES....58
26. OPERATING/PROCESS UTILITIES....59
30. CHEMICALS....60
35. FILTERS, OTHER CONSUMABLES....61
40. HEALTH & SAFETY....61
45. DISPOSALS STARTUP....61
50. PERSONNEL TRAINING....62
55. SAMPLING/ANALYSIS; STARTUP....62
60. SOURCE TEST....65
30. DEMOBILIZATION
21. DEMOBILIZATION
01. Removal of Temp Facilities....66
02. Removal of Temp Utilities....66
04. Demobe of Construction Equipment....66
22. REPORTS, CLOSEOUT
5. Closeout Safety Report....67
10. Record Drawings....67
15. Chemical Data Final Report....67
20. Remedial Action Report....68
3400. 1ST YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....69
10. ERH SYSTEM OP/REPORTING....70
15. SITE SECURITY....70
10. SITE FACILITIES....71
15. HEALTH & SAFETY....72
20. MATERIALS & SUPPLIES....73
25. MAINTENANCE....74
30. UTILITIES....75
35. SITE O&M LABOR & MISC EQUIPMENT....76
40. CHEMICALS....77
45. DISPOSALS
5. SLUDGE....78
10. CARBON (GAC, VAPOR PHASE)....78
15. CARBON (GAC, LIQUID PHASE)....78
20. PPE & MISC....78
25. OILY WASTE....79
30. WASTE MISC COSTS....79
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....80
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....80
10. PERIMETER MONITORING WELLS....81
15. WASTE DISPOSAL CHARACTERIZATION....81
20. GWTP DISCHARGE TO REINJECT WELLS....82

DETAILED ESTIMATE DETAIL PAGE

25. SAMPLING TECHNICIANS....83
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....85
10. MONITORING WELL SAMPLES....85
15. AIR MONITORING SAMPLES....85
20. MISC SAMPLES....85
3405. 2ND YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....86
10. ERH SYSTEM OP/REPORTING....87
15. SITE SECURITY....87
10. SITE FACILITIES....88
15. HEALTH & SAFETY....89
20. MATERIALS & SUPPLIES....90
25. MAINTENANCE....91
30. UTILITIES....92
35. SITE O&M LABOR & MISC EQUIPMENT....93
40. CHEMICALS....94
45. DISPOSALS
5. SLUDGE....95
10. CARBON (GAC, VAPOR PHASE)....95
15. CARBON (GAC, LIQUID PHASE)....95
20. PPE & MISC....95
25. OILY WASTE....96
30. WASTE MISC COSTS....96
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....97
10. SOIL SAMPLING (DRILL BACK)....97
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....98
10. PERIMETER MONITORING WELLS....99
15. WASTE DISPOSAL CHARACTERIZATION....99
20. GWTP DISCHARGE TO REINJECT WELLS....100
25. SAMPLING TECHNICIANS....101
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....103
10. MONITORING WELL SAMPLES....103
15. AIR MONITORING SAMPLES....103
20. MISC SAMPLES....103
60. DEMOBE/DEMO SPH 6PH COMPONENTS....104
3410. 3RD YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....105
15. SITE SECURITY....106
10. SITE FACILITIES....107
15. HEALTH & SAFETY....108
20. MATERIALS & SUPPLIES....109
25. MAINTENANCE....110

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....111
35. SITE O&M LABOR & MISC EQUIPMENT....112
40. CHEMICALS....113
45. DISPOSALS
5. SLUDGE....114
10. CARBON (GAC, VAPOR PHASE)....114
15. CARBON (GAC, LIQUID PHASE)....114
20. PPE & MISC....114
25. OILY WASTE....115
30. WASTE MISC COSTS....115
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....116
10. SOIL SAMPLING (DRILL BACK)....116
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....117
10. PERIMETER MONITORING WELLS....118
15. WASTE DISPOSAL CHARACTERIZATION....118
20. GWTP DISCHARGE TO REINJECT WELLS....119
25. SAMPLING TECHNICIANS....120
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....122
10. MONITORING WELL SAMPLES....122
15. AIR MONITORING SAMPLES....122
20. MISC SAMPLES....122
3415. 4TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....123
15. SITE SECURITY....124
10. SITE FACILITIES....125
15. HEALTH & SAFETY....126
20. MATERIALS & SUPPLIES....127
25. MAINTENANCE....128
30. UTILITIES....129
35. SITE O&M LABOR & MISC EQUIPMENT....130
40. CHEMICALS....131
45. DISPOSALS
5. SLUDGE....132
10. CARBON (GAC, VAPOR PHASE)....132
15. CARBON (GAC, LIQUID PHASE)....132
20. PPE & MISC....132
25. OILY WASTE....133
30. WASTE MISC COSTS....133
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....134
10. SOIL SAMPLING (DRILL BACK)....134
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....135
10. PERIMETER MONITORING WELLS....136

DETAILED ESTIMATE DETAIL PAGE

15. WASTE DISPOSAL CHARACTERIZATION.....136
20. GWTP DISCHARGE TO REINJECT WELLS.....137
25. SAMPLING TECHNICIANS.....138
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....140
10. MONITORING WELL SAMPLES.....140
15. AIR MONITORING SAMPLES.....140
20. MISC SAMPLES.....140
60. REMOVE/DEMO STEAM EQUIPMENT
5. DEMOLITION/REMOVAL EQUIPMENT.....141
10. DISPOSALS.....141
3420. 5TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....142
15. SITE SECURITY.....143
10. SITE FACILITIES.....144
15. HEALTH & SAFETY.....145
20. MATERIALS & SUPPLIES.....146
25. MAINTENANCE.....147
30. UTILITIES.....148
35. SITE O&M LABOR & MISC EQUIPMENT.....149
40. CHEMICALS.....150
45. DISPOSALS
5. SLUDGE.....151
15. CARBON (GAC, LIQUID PHASE).....151
20. PPE & MISC.....151
25. OILY WASTE.....151
30. WASTE MISC COSTS.....152
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS).....153
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS.....153
10. PERIMETER MONITORING WELLS.....154
15. WASTE DISPOSAL CHARACTERIZATION.....155
20. GWTP DISCHARGE TO REINJECT WELLS.....155
25. SAMPLING TECHNICIANS.....156
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....158
10. MONITORING WELL SAMPLES.....158
20. MISC SAMPLES.....158
3425. 6TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....159
15. SITE SECURITY.....160
10. SITE FACILITIES.....161
15. HEALTH & SAFETY.....162
20. MATERIALS & SUPPLIES.....163
25. MAINTENANCE.....164

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....165
35. SITE O&M LABOR & MISC EQUIPMENT....166
40. CHEMICALS....167
45. DISPOSALS
5. SLUDGE....168
15. CARBON (GAC, LIQUID PHASE)....168
20. PPE & MISC....168
25. OILY WASTE....168
30. WASTE MISC COSTS....169
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....170
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....170
10. PERIMETER MONITORING WELLS....171
15. WASTE DISPOSAL CHARACTERIZATION....172
20. GWTP DISCHARGE TO REINJECT WELLS....172
25. SAMPLING TECHNICIANS....173
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....175
10. MONITORING WELL SAMPLES....175
20. MISC SAMPLES....175
3430. 7TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....176
15. SITE SECURITY....177
10. SITE FACILITIES....178
15. HEALTH & SAFETY....179
20. MATERIALS & SUPPLIES....180
25. MAINTENANCE....181
30. UTILITIES....182
35. SITE O&M LABOR & MISC EQUIPMENT....183
40. CHEMICALS....184
45. DISPOSALS
5. SLUDGE....185
15. CARBON (GAC, LIQUID PHASE)....185
20. PPE & MISC....185
25. OILY WASTE....185
30. WASTE MISC COSTS....186
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....187
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....187
10. PERIMETER MONITORING WELLS....188
15. WASTE DISPOSAL CHARACTERIZATION....189
20. GWTP DISCHARGE TO REINJECT WELLS....189
25. SAMPLING TECHNICIANS....190
15. CONFIRMATIONAL SAMPLING
10. SOIL SAMPLING (DRILL BACK)....191

DETAILED ESTIMATE DETAIL PAGE

15. LIF SURVEY.....192
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....193
10. MONITORING WELL SAMPLES.....193
20. MISC SAMPLES.....193
60. DEMO/REMOVAL TREATMENT SYSTEM
02. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT.....194
02. ADMINISTRATION HOME OFFICE.....194
03. PURCHASING.....195
06. FIRST AID, FIRE, TRAFFIC, SECUR.....196
07. HEALTH & SAFETY.....196
09. TEMP CONSTRUCTION FACILITIES.....197
10. PROJECT UTILITIES.....198
05. DEMO GWTP.....199
10. DEMO PIPING.....199
15. PLUG & ABANDON WELLS.....199
20. DISPOSALS.....199
3435. 8TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....201
49. SAMPLING & ANALYSIS
10. COMPLIANCE MONITORING
10. PERIMETER MONITORING WELLS.....203
25. SAMPLING TECHNICIANS.....203
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
10. MONITORING WELL SAMPLES.....205

BACKUP REPORTS BACKUP PAGE

CREW BACKUP.....1
LABOR BACKUP.....8
EQUIPMENT BACKUP.....9

* * * END TABLE OF CONTENTS * * *

** PROJECT INDIRECT SUMMARY - ACCOUNT **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS	1.00	JOB	23,792,919	1,427,575	2,522,049	138,713	27,881,256	27881256.29
3400 1ST YEAR O&M	12.00	MO	7,336,729	440,204	777,693	42,773	8,597,399	716449.91
3405 2ND YEAR O&M	12.00	MO	6,848,378	410,903	725,928	39,926	8,025,135	668761.24
3410 3RD YEAR O&M	12.00	MO	5,345,627	320,738	566,636	31,165	6,264,166	522013.87
3415 4TH YEAR O&M	12.00	MO	4,807,465	288,448	509,591	28,028	5,633,532	469461.02
3420 5TH YEAR O&M	12.00	MO	2,095,140	125,708	222,085	12,215	2,455,148	204595.68
3425 6TH YEAR O&M	12.00	MO	2,091,673	125,500	221,717	12,194	2,451,085	204257.07
3430 7TH YEAR O&M	12.00	MO	3,526,371	211,582	373,795	20,559	4,132,307	344358.91
3435 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
TOTAL McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	55,939,544	3,356,373	5,929,592	326,128	65,551,636	65551636.34
Scope Contingency	9.53	%					6,244,665	
SUBTOTAL							71,796,301	
Bid Contingency	9.45	%					6,787,712	
TOTAL INCL OWNER COSTS							78,584,013	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
3300.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
3300.12 ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
3300.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	742,364	44,542	78,691	4,328	869,925	869924.79
3300.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	18,305,905	1,098,354	1,940,426	106,723	21,451,409	21451408.75
3300.25 START UP, TESTING, O&M PLAN	1.00	JOB	586,331	35,180	62,151	3,418	687,080	687079.86
3300.30 DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
TOTAL CAPITAL COSTS	1.00	JOB	23,792,919	1,427,575	2,522,049	138,713	27,881,256	27881256.29
Scope Contingency	9.50	%					2,648,028	
SUBTOTAL							30,529,284	
Bid Contingency	9.98	%					3,046,434	
TOTAL INCL OWNER COSTS							33,575,718	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3400.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3400.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3400.25 MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
3400.30 UTILITIES	12.00	MO	5,094,430	305,666	540,010	29,701	5,969,805	497483.78
3400.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3400.40 CHEMICALS	12.00	MO	87,320	5,239	9,256	509	102,324	8527.02
3400.45 DISPOSALS	12.00	MO	233,559	14,014	24,757	1,362	273,691	22807.59
3400.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
3400.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 1ST YEAR O&M	12.00	MO	7,336,729	440,204	777,693	42,773	8,597,399	716449.91
Scope Contingency	9.55	%					821,007	
SUBTOTAL							9,418,405	
Bid Contingency	9.42	%					887,622	
TOTAL INCL OWNER COSTS							10,306,027	
3405 2ND YEAR O&M								
3405. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3405.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3405.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3405.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55

** PROJECT INDIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3405.30	UTILITIES	12.00	MO	4,500,664	270,040	477,070	26,239	5,274,013	439501.07
3405.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3405.40	CHEMICALS	12.00	MO	82,570	4,954	8,752	481	96,758	8063.17
3405.45	DISPOSALS	12.00	MO	234,734	14,084	24,882	1,368	275,068	22922.33
3405.49	SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3405.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3405.60	DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
TOTAL 2ND YEAR O&M		12.00	MO	6,848,378	410,903	725,928	39,926	8,025,135	668761.24
Scope Contingency		9.52	%					763,780	
SUBTOTAL								8,788,915	
Bid Contingency		9.32	%					819,418	
TOTAL INCL OWNER COSTS								9,608,333	
3410	3RD YEAR O&M								
3410. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3410.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3410.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3410.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3410.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3410.30	UTILITIES	12.00	MO	3,400,392	204,024	360,442	19,824	3,984,681	332056.78
3410.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3410.40	CHEMICALS	12.00	MO	68,883	4,133	7,302	402	80,719	6726.60
3410.45	DISPOSALS	12.00	MO	229,818	13,789	24,361	1,340	269,307	22442.27
3410.49	SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3410.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 3RD YEAR O&M		12.00	MO	5,345,627	320,738	566,636	31,165	6,264,166	522013.87
Scope Contingency		9.71	%					607,981	
SUBTOTAL								6,872,147	
Bid Contingency		9.44	%					649,053	
TOTAL INCL OWNER COSTS								7,521,201	
3415	4TH YEAR O&M								
3415. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3415.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3415.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3415.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3415.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3415.30	UTILITIES	12.00	MO	2,844,190	170,651	301,484	16,582	3,332,907	277742.22

** PROJECT INDIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3415.40	CHEMICALS	12.00	MO	58,445	3,507	6,195	341	68,488	5707.30
3415.45	DISPOSALS	12.00	MO	227,086	13,625	24,071	1,324	266,106	22175.54
3415.49	SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3415.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3415.60	REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
TOTAL 4TH YEAR O&M		12.00	MO	4,807,465	288,448	509,591	28,028	5,633,532	469461.02
Scope Contingency		9.64	%					543,089	
SUBTOTAL								6,176,621	
Bid Contingency		9.38	%					579,501	
TOTAL INCL OWNER COSTS								6,756,122	
3420	5TH YEAR O&M								
3420. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3420.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3420.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3420.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3420.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3420.30	UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3420.40	CHEMICALS	12.00	MO	46,195	2,772	4,897	269	54,133	4511.06
3420.45	DISPOSALS	12.00	MO	219,701	13,182	23,288	1,281	257,452	21454.37
3420.49	SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3420.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL 5TH YEAR O&M		12.00	MO	2,095,140	125,708	222,085	12,215	2,455,148	204595.68
Scope Contingency		9.27	%					227,601	
SUBTOTAL								2,682,749	
Bid Contingency		8.80	%					236,073	
TOTAL INCL OWNER COSTS								2,918,822	
3425	6TH YEAR O&M								
3425. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3425.30	UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3425.40	CHEMICALS	12.00	MO	43,820	2,629	4,645	255	51,350	4279.13

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3425.45 DISPOSALS	12.00	MO	218,609	13,117	23,173	1,274	256,172	21347.69
3425.49 SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3425.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL 6TH YEAR O&M	12.00	MO	2,091,673	125,500	221,717	12,194	2,451,085	204257.07
Scope Contingency	9.27	%					227,195	
SUBTOTAL							2,678,279	
Bid Contingency	8.80	%					235,626	
TOTAL INCL OWNER COSTS							2,913,906	
3430 7TH YEAR O&M								
3430. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3430.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3430.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3430.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3430.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3430.30 UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
3430.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3430.40 CHEMICALS	12.00	MO	41,445	2,487	4,393	242	48,566	4047.21
3430.45 DISPOSALS	12.00	MO	217,516	13,051	23,057	1,268	254,892	21241.00
3430.49 SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
3430.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
3430.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
TOTAL 7TH YEAR O&M	12.00	MO	3,526,371	211,582	373,795	20,559	4,132,307	344358.91
Scope Contingency	9.57	%					395,317	
SUBTOTAL							4,527,624	
Bid Contingency	7.24	%					327,870	
TOTAL INCL OWNER COSTS							4,855,494	
3435 8TH YEAR O&M								
3435. 5 GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77
3435.49 SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
3435.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
TOTAL 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
Scope Contingency	9.56	%					10,668	
SUBTOTAL							122,276	
Bid Contingency	5.00	%					6,114	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							128,390	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS								
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1.00	JOB	1,314,235	78,854	139,309	7,662	1,540,060	1540059.88
3300.05.02 ADMINISTRATION HOME OFFICE	1.00	JOB	400,201	24,012	42,421	2,333	468,967	468967.07
3300.05.03 PURCHASING	1.00	JOB	123,860	7,432	13,129	722	145,143	145142.86
3300.05.06 FIRST AID, FIRE, TRAFFIC, SECUR	1.00	JOB	136,647	8,199	14,485	797	160,127	160126.79
3300.05.07 HEALTH & SAFETY	1.00	JOB	72,883	4,373	7,726	425	85,407	85406.83
3300.05.09 TEMP CONSTRUCTION FACILITIES	1.00	JOB	118,810	7,129	12,594	693	139,225	139225.12
3300.05.10 PROJECT UTILITIES	1.00	JOB	18,902	1,134	2,004	110	22,150	22149.70
3300.05.15 PATENT FEES			100,000	6,000	10,600	583	117,183	
TOTAL GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
Scope Contingency	5.00	%					133,913	
SUBTOTAL							2,812,174	
Bid Contingency	10.00	%					281,217	
TOTAL INCL OWNER COSTS							3,093,392	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01 Construction Work Plan	1.00	EA	12,230	734	1,296	71	14,331	14331.01
3300.10.02 Contractors QC Management Plan	1.00	EA	7,302	438	774	43	8,556	8556.23
3300.10.03 Contractors Chem Quality Control	1.00	EA	13,774	826	1,460	80	16,141	16140.79
3300.10.05 Regulatory Compliance Plan/Updat	1.00	EA	38,950	2,337	4,129	227	45,643	45642.78
3300.10.06 Traffic Routing Plan	1.00	EA	1,979	119	210	12	2,319	2318.58
3300.10.07 Site Health and Safety Plan	1.00	EA	11,806	708	1,251	69	13,834	13834.16
3300.10.15 Performance Testing Plan	1.00	EA	10,723	643	1,137	63	12,566	12565.77
3300.10.41 Subcontracting Plan	1.00	EA	2,398	144	254	14	2,811	2810.52
3300.10.42 Environmental Protection Plan	1.00	EA	3,333	200	353	19	3,905	3905.48
3300.10.43 Correct/Emerg Conting Action Pln	1.00	EA	3,064	184	325	18	3,591	3590.96
TOTAL SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
Scope Contingency	5.00	%					6,185	
SUBTOTAL							129,881	
Bid Contingency	5.00	%					6,494	
TOTAL INCL OWNER COSTS							136,375	
3300.12 ENGINEERING								
3300.12.10 COMPLETION DESIGN - CIVIL	1.00	JOB	184,160	11,050	19,521	1,074	215,804	215804.21
3300.12.15 COMPLETION DESIGN - PROCESS	1.00	JOB	430,800	25,848	45,665	2,512	504,824	504824.36

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.12.20 COMPLETION DESIGN - ELECTRICAL	1.00	JOB	98,110	5,887	10,400	572	114,968	114968.24
3300.12.32 COMPLETION DESIGN - MECHANICAL	1.00	JOB	64,180	3,851	6,803	374	75,208	75208.05
3300.12.37 COMPLETE DESIGN - SPECIALTY SUB	1.00	JOB	800,000	48,000	84,800	4,664	937,464	937464.00
TOTAL ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
Scope Contingency	10.00	%					188,421	
SUBTOTAL							2,072,626	
Bid Contingency	10.00	%					207,263	
TOTAL INCL OWNER COSTS							2,279,889	
3300.15 MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01 CLEAR SITE BRUSH	30.00	ACR	18,523	1,111	1,963	108	21,706	723.52
3300.15.02 MOBE EQUIP & FACILITIES	1.00	JOB	1,284	77	136	7	1,505	1504.60
3300.15.05 TEMPORARY FACILITIES	1.00	JOB	261,135	15,668	27,680	1,522	306,006	306006.01
3300.15.08 SIGNS, BARRICADES	1.00	JOB	79,554	4,773	8,433	464	93,223	93223.28
3300.15.10 GRAVEL CAP	10.80	ACR	247,511	14,851	26,236	1,443	290,041	26855.62
3300.15.15 ASPHALT CAP	4222.00	SY	93,922	5,635	9,956	548	110,061	26.07
3300.15.92 SURVEYS	1.00	JOB	29,000	1,740	3,074	169	33,983	33983.07
3300.15.97 MEETINGS	2.00	EA	11,435	686	1,212	67	13,400	6700.22
TOTAL MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	742,364	44,542	78,691	4,328	869,925	869924.79
Scope Contingency	10.00	%					86,992	
SUBTOTAL							956,917	
Bid Contingency	10.00	%					95,692	
TOTAL INCL OWNER COSTS							1,052,609	
3300.20 TREATMENT SYSTEM CONSTRUCTION								
3300.20.01 TREATMENT PLANT BUILDING	1.00	JOB	390,329	23,420	41,375	2,276	457,399	457398.69
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	3,923,758	235,425	415,918	22,876	4,597,978	4597977.71
3300.20.07 WELL INSTRUMENTS/CONTROLS	1.00	JOB	2,060,809	123,649	218,446	12,015	2,414,918	2414917.76
3300.20.10 INSTALL WELLS	1.00	JOB	8,078,934	484,736	856,367	47,100	9,467,137	9467136.85
3300.20.15 PIPING	1.00	JOB	3,852,076	231,125	408,320	22,458	4,513,978	4513977.73
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	18,305,905	1,098,354	1,940,426	106,723	21,451,409	21451408.75
Scope Contingency	10.00	%					2,145,141	
SUBTOTAL							23,596,550	
Bid Contingency	10.00	%					2,359,655	
TOTAL INCL OWNER COSTS							25,956,205	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.25 START UP, TESTING, O&M PLAN								
3300.25. 5 O&M MANUAL	1.00	JOB	43,043	2,583	4,563	251	50,439	50438.70
3300.25.10 STARTUP/COMMISSION TREATMENT SYS	1.00	JOB	543,288	32,597	57,589	3,167	636,641	636641.15
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	586,331	35,180	62,151	3,418	687,080	687079.86
Scope Contingency	10.00	%					68,708	
SUBTOTAL							755,788	
Bid Contingency	10.00	%					75,579	
TOTAL INCL OWNER COSTS							831,367	
3300.30 DEMOBILIZATION								
3300.30.21 DEMOBILIZATION	1.00	JOB	14,171	850	1,502	83	16,606	16606.21
3300.30.22 REPORTS, CLOSEOUT	1.00	JOB	145,135	8,708	15,384	846	170,074	170073.78
TOTAL DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
Scope Contingency	10.00	%					18,668	
SUBTOTAL							205,348	
Bid Contingency	10.00	%					20,535	
TOTAL INCL OWNER COSTS							225,883	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS								
3400. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3400. 5.10 ERH SYSTEM OP/REPORTING	12.00	MO	346,424	20,785	36,721	2,020	405,950	33829.17
3400. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
Scope Contingency	5.00	%					34,095	
SUBTOTAL							715,993	
Bid Contingency	5.00	%					35,800	
TOTAL INCL OWNER COSTS							751,793	
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	TOTAL INCL OWNER COSTS							60,101	
3400.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3400.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3400.25	MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
	Scope Contingency	10.00	%					9,384	
	SUBTOTAL							103,224	
	Bid Contingency	10.00	%					10,322	
	TOTAL INCL OWNER COSTS							113,547	
3400.30	UTILITIES	12.00	MO	5,094,430	305,666	540,010	29,701	5,969,805	497483.78
	Scope Contingency	10.00	%					596,981	
	SUBTOTAL							6,566,786	
	Bid Contingency	10.00	%					656,679	
	TOTAL INCL OWNER COSTS							7,223,464	
3400.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3400.40	CHEMICALS	12.00	MO	87,320	5,239	9,256	509	102,324	8527.02
	Scope Contingency	10.00	%					10,232	
	SUBTOTAL							112,557	
	Bid Contingency	10.00	%					11,256	
	TOTAL INCL OWNER COSTS							123,812	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3400.45 DISPOSALS								
3400.45. 5 SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3400.45.10 CARBON (GAC, VAPOR PHASE)	12.00	MO	5,200	312	551	30	6,094	507.79
3400.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	15,295	918	1,621	89	17,923	1493.59
3400.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3400.45.25 OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3400.45.30 WASTE MISC COSTS	12.00	MO	12,350	741	1,309	72	14,472	1206.01
TOTAL DISPOSALS	12.00	MO	233,559	14,014	24,757	1,362	273,691	22807.59
Scope Contingency	10.00	%					27,369	
SUBTOTAL							301,060	
Bid Contingency	10.00	%					30,106	
TOTAL INCL OWNER COSTS							331,166	
3400.49 SAMPLING & ANALYSIS								
3400.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3400.49.10 COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
Scope Contingency	10.00	%					24,634	
SUBTOTAL							270,970	
Bid Contingency	5.00	%					13,548	
TOTAL INCL OWNER COSTS							284,518	
3400.55 QC & ANALYTICAL DATA VALIDATION								
3400.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	

3405 2ND YEAR O&M

3405. 5 GENERAL CONDITIONS

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3405. 5.10 ERH SYSTEM OP/REPORTING	12.00	MO	346,424	20,785	36,721	2,020	405,950	33829.17
3405. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
Scope Contingency	5.00	%					34,095	
SUBTOTAL							715,993	
Bid Contingency	5.00	%					35,800	
TOTAL INCL OWNER COSTS							751,793	
3405.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3405.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	
SUBTOTAL							11,664	
Bid Contingency	5.00	%					583	
TOTAL INCL OWNER COSTS							12,248	
3405.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
Scope Contingency	10.00	%					422	
SUBTOTAL							4,640	
Bid Contingency	10.00	%					464	
TOTAL INCL OWNER COSTS							5,104	
3405.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
Scope Contingency	10.00	%					8,212	
SUBTOTAL							90,334	
Bid Contingency	10.00	%					9,033	
TOTAL INCL OWNER COSTS							99,367	
3405.30 UTILITIES	12.00	MO	4,500,664	270,040	477,070	26,239	5,274,013	439501.07
Scope Contingency	10.00	%					527,401	
SUBTOTAL							5,801,414	
Bid Contingency	10.00	%					580,141	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	TOTAL INCL OWNER COSTS							6,381,556	
3405.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3405.40	CHEMICALS	12.00	MO	82,570	4,954	8,752	481	96,758	8063.17
	Scope Contingency	10.00	%					9,676	
	SUBTOTAL							106,434	
	Bid Contingency	10.00	%					10,643	
	TOTAL INCL OWNER COSTS							117,077	
3405.45	DISPOSALS								
3405.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3405.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	5,200	312	551	30	6,094	507.79
3405.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	13,110	787	1,390	76	15,363	1280.22
3405.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3405.45.25	OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3405.45.30	WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
	TOTAL DISPOSALS	12.00	MO	234,734	14,084	24,882	1,368	275,068	22922.33
	Scope Contingency	10.00	%					27,507	
	SUBTOTAL							302,575	
	Bid Contingency	10.00	%					30,257	
	TOTAL INCL OWNER COSTS							332,832	
3405.49	SAMPLING & ANALYSIS								
3405.49. 5	PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3405.49.10	COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
	TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
	Scope Contingency	10.00	%					34,188	
	SUBTOTAL							376,073	
	Bid Contingency	5.00	%					18,804	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							394,877	
3405.55 QC & ANALYTICAL DATA VALIDATION								
3405.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3405.60 DEMORE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
Scope Contingency	10.00	%					4,389	
SUBTOTAL							48,276	
Bid Contingency	10.00	%					4,828	
TOTAL INCL OWNER COSTS							53,104	
3410 3RD YEAR O&M								
3410. 5 GENERAL CONDITIONS								
3410. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3410. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3410.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3410.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3410.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3410.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3410.30	UTILITIES	12.00	MO	3,400,392	204,024	360,442	19,824	3,984,681	332056.78
	Scope Contingency	10.00	%					398,468	
	SUBTOTAL							4,383,149	
	Bid Contingency	10.00	%					438,315	
	TOTAL INCL OWNER COSTS							4,821,464	
3410.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3410.40	CHEMICALS	12.00	MO	68,883	4,133	7,302	402	80,719	6726.60
	Scope Contingency	10.00	%					8,072	
	SUBTOTAL							88,791	
	Bid Contingency	10.00	%					8,879	
	TOTAL INCL OWNER COSTS							97,670	
3410.45	DISPOSALS								
3410.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3410.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	5,200	312	551	30	6,094	507.79

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3410.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	8,194	492	869	48	9,602	800.16
3410.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3410.45.25 OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3410.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	229,818	13,789	24,361	1,340	269,307	22442.27
Scope Contingency	10.00	%					26,931	
SUBTOTAL							296,238	
Bid Contingency	10.00	%					29,624	
TOTAL INCL OWNER COSTS							325,862	
3410.49 SAMPLING & ANALYSIS								
3410.49. 5 PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3410.49.10 COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
Scope Contingency	10.00	%					34,188	
SUBTOTAL							376,073	
Bid Contingency	5.00	%					18,804	
TOTAL INCL OWNER COSTS							394,877	
3410.55 QC & ANALYTICAL DATA VALIDATION								
3410.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3415 4TH YEAR O&M								
3415. 5 GENERAL CONDITIONS								
3415. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3415. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00	%					13,797	
	SUBTOTAL							289,746	
	Bid Contingency	5.00	%					14,487	
	TOTAL INCL OWNER COSTS							304,233	
3415.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3415.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3415.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3415.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3415.30	UTILITIES	12.00	MO	2,844,190	170,651	301,484	16,582	3,332,907	277742.22
	Scope Contingency	10.00	%					333,291	
	SUBTOTAL							3,666,197	
	Bid Contingency	10.00	%					366,620	
	TOTAL INCL OWNER COSTS							4,032,817	
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3415.40	CHEMICALS	12.00	MO	58,445	3,507	6,195	341	68,488	5707.30
	Scope Contingency	10.00	%					6,849	
	SUBTOTAL							75,336	
	Bid Contingency	10.00	%					7,534	
	TOTAL INCL OWNER COSTS							82,870	
3415.45	DISPOSALS								
3415.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3415.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	5,200	312	551	30	6,094	507.79
3415.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	5,463	328	579	32	6,401	533.43
3415.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3415.45.25	OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3415.45.30	WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
	TOTAL DISPOSALS	12.00	MO	227,086	13,625	24,071	1,324	266,106	22175.54
	Scope Contingency	10.00	%					26,611	
	SUBTOTAL							292,717	
	Bid Contingency	10.00	%					29,272	
	TOTAL INCL OWNER COSTS							321,989	
3415.49	SAMPLING & ANALYSIS								
3415.49. 5	PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3415.49.10	COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
	TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
	Scope Contingency	10.00	%					34,188	
	SUBTOTAL							376,073	
	Bid Contingency	5.00	%					18,804	
	TOTAL INCL OWNER COSTS							394,877	
3415.55	QC & ANALYTICAL DATA VALIDATION								
3415.55. 5	DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3415.60 REMOVE/DEMO STEAM EQUIPMENT								
3415.60. 5 DEMOLITION/REMOVAL EQUIPMENT	1.00	JOB	21,210	1,273	2,248	124	24,855	24854.69
3415.60.10 DISPOSALS	1.00	JOB	10,000	600	1,060	58	11,718	11718.30
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
Scope Contingency	5.00	%					1,829	
SUBTOTAL							38,402	
Bid Contingency	10.00	%					3,840	
TOTAL INCL OWNER COSTS							42,242	
3420 5TH YEAR O&M								
3420. 5 GENERAL CONDITIONS								
3420. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3420. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3420.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3420.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3420.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3420.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3420.30	UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
	Scope Contingency	10.00	%					32,294	
	SUBTOTAL							355,229	
	Bid Contingency	10.00	%					35,523	
	TOTAL INCL OWNER COSTS							390,752	
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3420.40	CHEMICALS	12.00	MO	46,195	2,772	4,897	269	54,133	4511.06
	Scope Contingency	10.00	%					5,413	
	SUBTOTAL							59,546	
	Bid Contingency	10.00	%					5,955	
	TOTAL INCL OWNER COSTS							65,501	
3420.45	DISPOSALS								
3420.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3420.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	3,278	197	347	19	3,841	320.06

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3420.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3420.45.25 OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3420.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	219,701	13,182	23,288	1,281	257,452	21454.37
Scope Contingency	10.00	%					25,745	
SUBTOTAL							283,198	
Bid Contingency	10.00	%					28,320	
TOTAL INCL OWNER COSTS							311,518	
3420.49 SAMPLING & ANALYSIS								
3420.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3420.49.10 COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00	%					24,349	
SUBTOTAL							267,844	
Bid Contingency	5.00	%					13,392	
TOTAL INCL OWNER COSTS							281,236	
3420.55 QC & ANALYTICAL DATA VALIDATION								
3420.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3425 6TH YEAR O&M								
3425. 5 GENERAL CONDITIONS								
3425. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3425. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00	%					13,797	
	SUBTOTAL							289,746	
	Bid Contingency	5.00	%					14,487	
	TOTAL INCL OWNER COSTS							304,233	
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3425.30	UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
	Scope Contingency	10.00	%					32,294	
	SUBTOTAL							355,229	
	Bid Contingency	10.00	%					35,523	
	TOTAL INCL OWNER COSTS							390,752	
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Bid Contingency	10.00 %					124,577	
TOTAL INCL OWNER COSTS						1,370,344	
3425.40 CHEMICALS	12.00 MO	43,820	2,629	4,645	255	51,350	4279.13
Scope Contingency	10.00 %					5,135	
SUBTOTAL						56,485	
Bid Contingency	10.00 %					5,648	
TOTAL INCL OWNER COSTS						62,133	
3425.45 DISPOSALS							
3425.45. 5 SLUDGE	12.00 MO	29,000	1,740	3,074	169	33,983	2831.92
3425.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	2,185	131	232	13	2,560	213.37
3425.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3425.45.25 OILY WASTE	12.00 MO	169,714	10,183	17,990	989	198,876	16572.97
3425.45.30 WASTE MISC COSTS	12.00 MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00 MO	218,609	13,117	23,173	1,274	256,172	21347.69
Scope Contingency	10.00 %					25,617	
SUBTOTAL						281,789	
Bid Contingency	10.00 %					28,179	
TOTAL INCL OWNER COSTS						309,968	
3425.49 SAMPLING & ANALYSIS							
3425.49. 5 PERFORMANCE MONITORING	12.00 MO	15,067	904	1,597	88	17,656	1471.36
3425.49.10 COMPLIANCE MONITORING	12.00 MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00 MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00 %					24,349	
SUBTOTAL						267,844	
Bid Contingency	5.00 %					13,392	
TOTAL INCL OWNER COSTS						281,236	
3425.55 QC & ANALYTICAL DATA VALIDATION							
3425.55. 5 DATA VALIDATION	12.00 MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	14,256	855	1,511	83	16,706	1392.13

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3430 7TH YEAR O&M								
3430. 5 GENERAL CONDITIONS								
3430. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3430. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3430.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3430.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	
SUBTOTAL							11,664	
Bid Contingency	5.00	%					583	
TOTAL INCL OWNER COSTS							12,248	
3430.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
Scope Contingency	10.00	%					422	
SUBTOTAL							4,640	
Bid Contingency	10.00	%					464	
TOTAL INCL OWNER COSTS							5,104	
3430.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
Scope Contingency	10.00	%					8,212	
SUBTOTAL							90,334	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3430.30	UTILITIES	12.00	MO	275,582	16,535	29,212	1,607	322,936	26911.31
	Scope Contingency	10.00	%					32,294	
	SUBTOTAL							355,229	
	Bid Contingency	10.00	%					35,523	
	TOTAL INCL OWNER COSTS							390,752	
3430.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3430.40	CHEMICALS	12.00	MO	41,445	2,487	4,393	242	48,566	4047.21
	Scope Contingency	10.00	%					4,857	
	SUBTOTAL							53,423	
	Bid Contingency	10.00	%					5,342	
	TOTAL INCL OWNER COSTS							58,765	
3430.45	DISPOSALS								
3430.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3430.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	1,093	66	116	6	1,280	106.69
3430.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3430.45.25	OILY WASTE	12.00	MO	169,714	10,183	17,990	989	198,876	16572.97
3430.45.30	WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
	TOTAL DISPOSALS	12.00	MO	217,516	13,051	23,057	1,268	254,892	21241.00
	Scope Contingency	10.00	%					25,489	
	SUBTOTAL							280,381	
	Bid Contingency	10.00	%					28,038	
	TOTAL INCL OWNER COSTS							308,419	
3430.49	SAMPLING & ANALYSIS								
3430.49. 5	PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3430.49.10	COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3430.49.15 CONFIRMATIONAL SAMPLING			71,190	4,271	7,546	415	83,423	
TOTAL SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
Scope Contingency	10.00	%					32,692	
SUBTOTAL							359,609	
Bid Contingency	5.00	%					17,980	
TOTAL INCL OWNER COSTS							377,589	
3430.55 QC & ANALYTICAL DATA VALIDATION								
3430.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3430.60 DEMO/REMOVAL TREATMENT SYSTEM								
3430.60.02 GENERAL CONDITIONS	1.00	JOB	304,080	18,245	32,232	1,773	356,330	356329.68
3430.60.05 DEMO GWTP	1.00	JOB	85,020	5,101	9,012	496	99,629	99628.83
3430.60.10 DEMO PIPING	1.00	JOB	116,770	7,006	12,378	681	136,834	136834.50
3430.60.15 PLUG & ABANDON WELLS	1.00	JOB	261,106	15,666	27,677	1,522	305,972	305971.84
3430.60.20 DISPOSALS	1.00	JOB	600,000	36,000	63,600	3,498	703,098	703098.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
Scope Contingency	10.00	%					160,186	
SUBTOTAL							1,762,049	
Bid Contingency	5.00	%					88,102	
TOTAL INCL OWNER COSTS							1,850,152	
3435 8TH YEAR O&M								
3435. 5 GENERAL CONDITIONS								
3435. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	6,029	362	639	35	7,065	588.77
TOTAL GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00	%					353	
SUBTOTAL							7,418	
Bid Contingency	5.00	%					371	
TOTAL INCL OWNER COSTS							7,789	
3435.49 SAMPLING & ANALYSIS								
3435.49.10 COMPLIANCE MONITORING	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
TOTAL SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
Scope Contingency	10.00	%					10,176	
SUBTOTAL							111,934	
Bid Contingency	5.00	%					5,597	
TOTAL INCL OWNER COSTS							117,531	
3435.55 QC & ANALYTICAL DATA VALIDATION								
3435.55.5 DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
Scope Contingency	5.00	%					139	
SUBTOTAL							2,923	
Bid Contingency	5.00	%					146	
TOTAL INCL OWNER COSTS							3,070	

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300. CAPITAL COSTS								
3300.05. GENERAL CONDITIONS								
3300.05.01. FIELD SUPERVISION & MANAGEMENT								
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	3400.00 HR	227,171	0	0	0	0	227,171	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	3400.00 HR	147,798	0	0	0	0	147,798	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	3400.00 HR	180,642	0	0	0	0	180,642	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	3400.00 HR	65,688	0	0	0	0	65,688	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	3400.00 HR	125,902	0	0	0	0	125,902	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	3400.00 HR	147,798	0	0	0	0	147,798	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	3400.00 HR	174,041	0	0	0	0	174,041	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	6800.00 HR	0	37,400	0	0	0	37,400	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	54.00 MO	0	0	0	0	54,000	54,000	1000.00
for 18 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	2470.00 DAY	0	0	0	0	70,395	70,395	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	120.00 EA	0	0	0	0	60,000	60,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	120.00 EA	0	0	0	0	2,400	2,400	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	60000 MI	0	0	0	0	21,000	21,000	0.35

3300.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	1,069,040	37,400	0	0	207,795	1,314,235	1314234.90
3300.05.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	520.00	HR	53,768	0	0	0	0	53,768	103.40
USR AA Prin. Engineer/Scientist I;			91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	600.00	HR	54,780	0	0	0	0	54,780	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	1250.00	HR	48,125	0	0	0	0	48,125	38.50
USR AA Engineer/Scientist IV -			59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	2400.00	HR	142,560	0	0	0	0	142,560	59.40
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	312.00	HR	32,261	0	0	0	0	32,261	103.40
Health and Safety Manager									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	312.00	HR	32,261	0	0	0	0	32,261	103.40
gr									
USR AA Mileage on Personal Car Pjm			0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	41600	MI	0	0	0	0	12,896	12,896	0.31
s*									
USR AA Lodging; three mo for PjM plu			0.00	0.00	0.00	0.00	80.00	80.00	
s	150.00	DAY	0	0	0	0	12,000	12,000	80.00
additional visits during									
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	150.00	DAY	0	0	0	0	5,700	5,700	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	10.00	EA	0	0	0	0	5,000	5,000	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	10.00	DAY	0	0	0	0	450	450	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	20.00	EA	0	0	0	0	400	400	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	363,755	0	0	0	36,446	400,201	400200.60

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.03. PURCHASING								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	1600.00 HR	116,160	0	0	0	0	116,160	72.60
USR AA Secretary/Clerical IV Home		38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	200.00 HR	7,700	0	0	0	0	7,700	38.50
TOTAL PURCHASING	1.00 JOB	123,860	0	0	0	0	123,860	123860.00
3300.05.06. FIRST AID, FIRE, TRAFFIC, SECUR								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S		56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00 EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower		145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No	1.00 EA	145	1	123	0	0	269	269.19
Additional Copper Piping Etc.								
HTW AA Eye Wash Bowl		126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No	4.00 EA	508	4	661	0	0	1,173	293.21
Additional Copper Piping Etc.								
HTW AA First Aid Kit		0.00	0.00	75.00	0.00	0.00	75.00	
	16.00 EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher		0.00	0.00	150.00	0.00	0.00	150.00	
	2.00 EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	1,773	15	3,458	131,400	0	136,647	136646.78
3300.05.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	40.00 DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	100.00 DAY	0	0	1,200	0	0	1,200	12.00
USR AA Install/Decon Personnel Decon		192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00 LS	192	1	250	0	0	443	443.30

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	18.00 MO	0	14,400	0	0	0	14,400	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	18.00 MO	0	6,300	0	0	0	6,300	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	18.00 MO	0	7,650	0	0	0	7,650	425.00
USR AA Labor Allowance for Site		120.00	0.00	0.00	0.00	0.00	120.00	
Specific Training	60.00 EA	7,200	0	0	0	0	7,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	60.00 EA	12,000	0	0	0	0	12,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	60.00 EA	0	0	0	21,000	0	21,000	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	19,392	28,351	4,140	21,000	0	72,883	72883.30
3300.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	18.00 MO	0	0	0	0	1,350	1,350	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	18.00 MO	0	0	0	0	7,200	7,200	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	36.00 MO	0	0	0	0	3,060	3,060	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	18.00 MO	0	0	7,200	0	0	7,200	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	18.00 MO	0	10,800	0	0	0	10,800	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	18.00 MO	0	9,000	0	0	0	9,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	18.00 MO	0	1,800	0	0	0	1,800	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	18.00 MO	0	0	0	0	900	900	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	6.00 EA	0	18,000	0	0	0	18,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	3.00 EA	0	0	0	1,800	0	1,800	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00
USR AA COE Software, Primavera Suretrack		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 EA	0	0	500	0	0	500	500.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 EA	0	0	0	10,000	0	10,000	10000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 EA	0	0	0	5,000	0	5,000	5000.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	2.00 EA	0	0	0	10,000	0	10,000	5000.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	44,400	20,700	34,000	19,710	118,810	118810.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	18.00 MO	0	0	0	0	9,000	9,000	500.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	18.00 MO	0	0	0	0	8,100	8,100	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	18.00 MO	0	0	0	1,800	2	1,802	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	1,800	17,102	18,902	18901.80
3300.05.15. PATENT FEES								
USR AA Patent Fee Allowance		0.00	0.00	0.00	100000.00	0.00	100000.00	
	1.00 LS	0	0	0	100,000	0	100,000	100000.00
TOTAL PATENT FEES		0	0	0	100,000	0	100,000	
TOTAL GENERAL CONDITIONS	1.00 JOB	1,577,820	110,166	28,298	288,200	281,053	2,285,537	2285537.37

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10. SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01. Construction Work Plan								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	2.00 HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	24.00 HR	924	0	0	0	0	924	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	60.00 HR	5,082	0	0	0	0	5,082	84.70
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Response to Comments	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
TOTAL Construction Work Plan	1.00 EA	10,930	0	0	100	1,200	12,230	12229.60
3300.10.02. Contractors QC Management Plan								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	48.00 HR	2,851	0	0	0	0	2,851	59.40
USR AA Engineer/Scientist IV; Respon		59.40	0.00	0.00	0.00	0.00	59.40	
se	20.00 HR	1,188	0	0	0	0	1,188	59.40
to Comments								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Contractors QC Management Pla	1.00 EA	6,002	0	0	100	1,200	7,302	7301.60

3300.10.03. Contractors Chem Quality Control
Includes Contractors CQCMP, SAP, FSP, QAPP, Groundwater SAP, Process Liquid SAP.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA Senior Engineer/Scientist II; Project Chemist		72.60	0.00	0.00	0.00	0.00	72.60	
	100.00 HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist II; Project Chemist; Response to comments.		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors Chem Quality Cont	1.00 EA	12,474	0	0	100	1,200	13,774	13774.00

3300.10.05. Regulatory Compliance Plan/Updat
This work includes developing plan, quarterly updates to the plan for 8 quarters, and submitting permit/permit equivalency applications to all relevant federal, state and local agencies.

Permits (equivalencies) building, excavation, utility crossings, well, air emissions, Erosion Control, Stormwater, Electrical, Local permits are anticipated.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	120.00 HR	10,164	0	0	0	0	10,164	84.70
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA Permit Charges Allowance		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.30	0.30	
	880.00	MI	0	0	0	0	264	264	0.30
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	4.00	DAY	0	0	0	0	152	152	38.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Regulatory Compliance Plan/Up	1.00	EA	36,234	0	0	100	2,616	38,950	38950.00
3300.10.06. Traffic Routing Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	24.00	HR	1,426	0	0	0	0	1,426	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	10.00	10.00	
	24.00	EA	0	0	0	0	240	240	10.00
USR AA Mail			0.00	0.00	0.00	5.00	0.00	5.00	
	1.00	EA	0	0	0	5	0	5	5.00
TOTAL Traffic Routing Plan	1.00	EA	1,734	0	0	5	240	1,979	1978.60
3300.10.07. Site Health and Safety Plan Includes Air Monitoring Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	120.00	HR	7,128	0	0	0	0	7,128	59.40
USR AA Engineer/Scientist IV; Respon d to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	32.00	HR	1,901	0	0	0	0	1,901	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	8.00	HR	537	0	0	0	0	537	67.10
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
TOTAL Site Health and Safety Plan	1.00 EA	11,106	0	0	100	600	11,806	11805.60
3300.10.15. Performance Testing Plan Source testing, Boiler and Emissions Control System.								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	60.00 HR	4,026	0	0	0	0	4,026	67.10
USR AA Senior Engineer/Scientist I; Respond to Comments		67.10	0.00	0.00	0.00	0.00	67.10	
	16.00 HR	1,074	0	0	0	0	1,074	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Performance Testing Plan	1.00 EA	9,473	0	0	50	1,200	10,723	10723.20
3300.10.41. Subcontracting Plan								
USR AA Principal Engineer/Scientist I		103.40	0.00	0.00	0.00	0.00	103.40	
	4.00 HR	414	0	0	0	0	414	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA Senior Engineer/Scientist II; Site Superintendant		72.60	0.00	0.00	0.00	0.00	72.60	
	8.00 HR	581	0	0	0	0	581	72.60
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Subcontracting Plan	1.00 EA	1,148	0	0	50	1,200	2,398	2398.40
3300.10.42. Environmental Protection Plan								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments	4.00 HR	59.40 238	0.00 0	0.00 0	0.00 0	0.00 0	59.40 238	59.40
USR AA Senior Engineer/Scientist I - Draftsman	8.00 HR	67.10 537	0.00 0	0.00 0	0.00 0	0.00 0	67.10 537	67.10
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Environmental Protection Plan	1.00 EA	2,033	0	0	100	1,200	3,333	3332.80
3300.10.43. Correct/Emerg Conting Action Pln								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments	4.00 HR	59.40 238	0.00 0	0.00 0	0.00 0	0.00 0	59.40 238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist I - Draftsman	4.00 HR	67.10 268	0.00 0	0.00 0	0.00 0	0.00 0	67.10 268	67.10
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Correct/Emerg Conting Action	1.00	EA	1,764	0	0	100	1,200	3,064	3064.40
TOTAL SUBMITTALS/IMPLEMENTATION PLA	1.00	JOB	92,897	0	0	805	11,856	105,558	105558.20

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.12. ENGINEERING								
3300.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, steam, and gas lines, drainage, roads and parking.								
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	200.00 HR	15,840	0	0	0	0	15,840	79.20
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	200.00 HR	20,680	0	0	0	0	20,680	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	800.00 HR	58,080	0	0	0	0	58,080	72.60
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	1200.00 HR	50,160	0	0	0	0	50,160	41.80
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	800.00 HR	26,400	0	0	0	0	26,400	33.00
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00 EA	0	0	0	3,000	0	3,000	3.00
TOTAL COMPLETION DESIGN - CIVIL	1.00 JOB	171,160	0	0	3,000	10,000	184,160	184160.00
3300.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	1000.00 HR	103,400	0	0	0	0	103,400	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	2000.00 HR	83,600	0	0	0	0	83,600	41.80
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	2000.00 HR	169,400	0	0	0	0	169,400	84.70

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	1000.00 HR	48,400	0	0	0	0	48,400	48.40
USR AA ODC's		0.00	0.00	0.00	0.00	20000.00	20000.00	
	1.00 LS	0	0	0	0	20,000	20,000	20000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	2000.00 EA	0	0	0	6,000	0	6,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00 JOB	404,800	0	0	6,000	20,000	430,800	430800.00

3300.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II; Electrical Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Principal Engineer/Scientist I; Electrical Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Senior Engineer/Scientist II; Instrument Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	100.00 HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist I; Electrical Engineer		67.10	0.00	0.00	0.00	0.00	67.10	
	500.00 HR	33,550	0	0	0	0	33,550	67.10
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00 JOB	88,110	0	0	0	10,000	98,110	98110.00

3300.12.26. PCS PROGRAMMING - GROUNDWATER

3300.12.26.15. PC PROGRAMMING
Process Control programming of PLC/PCS.

USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	50.00 HR	4,565	0	0	0	0	4,565	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	200.00 HR	13,420	0	0	0	0	13,420	67.10

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PC PROGRAMMING	1.00 JOB	18,293	0	0	0	500	18,793	18793.00
3300.12.26.20. MMI PROGRAMMING Program man-machine interface, control panels, displays.								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	140.00 HR	9,394	0	0	0	0	9,394	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL MMI PROGRAMMING	1.00 JOB	11,374	0	0	0	500	11,874	11874.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00 JOB	29,667	0	0	0	1,000	30,667	30667.00
3300.12.32. COMPLETION DESIGN - MECHANICAL Design piping to and from all process equipment, wells, tanks, and instrument requirements, HVAC, building plumbing.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	300.00 HR	12,540	0	0	0	0	12,540	41.80
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	200.00 HR	16,940	0	0	0	0	16,940	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	400.00 HR	19,360	0	0	0	0	19,360	48.40

3300.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL COMPLETION DESIGN - MECHANICA	1.00	JOB	59,180	0	0	0	5,000	64,180	64180.00
3300.12.37. COMPLETE DESIGN - SPECIALTY SUB Specialty sub for steam and electrical resistance heating remediation systems including instrumentation, thermodynamics, estimates of waste removal and rate of heating, cooling, and waste removal rates. Systems may include steam injection, electrical resistance heating and related instrumentation and controls.									
USR AA Completion Design from			0.00	0.00	0.00	800000.00	0.00	800000.00	
Conceptual to Bid Package	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL COMPLETE DESIGN - SPECIALTY S	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL ENGINEERING	1.00	JOB	752,917	0	0	809,000	46,000	1,607,917	1607917.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15. MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01. CLEAR SITE BRUSH								
L AIR AA Clearing - Medium Brush w/o G		414.45	202.98	0.00	0.00	0.00	617.43	
rub	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
TOTAL CLEAR SITE BRUSH	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
3300.15.02. MOBE EQUIP & FACILITIES								
USR PL Mobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,284	1,284	256.80
TOTAL MOBE EQUIP & FACILITIES	1.00 JOB	0	0	0	0	1,284	1,284	1283.98
3300.15.05. TEMPORARY FACILITIES								
3300.15.05.20. TEMPORARY PAVING								
Paving at site offices and equipment building.								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
M MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	45.00	0.00	0.00	180.94	
se	13.00 TON	1,800	469	751	0	0	3,020	232.32
3954#/CY (2349Kg/M3),Ctrl Plant								
M MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	45.00	0.00	0.00	180.94	
e	13.00 TON	1,800	469	751	0	0	3,020	232.32
3774#/CY (2242Kg/M3),Ctrl Plant								
M CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	1.00	0.00	0.00	3.30	
Coal Tar Emulsion	120.00 SY	251	104	154	0	0	509	4.24
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL TEMPORARY PAVING		6,168	2,242	1,880	0	0	10,291	

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.05.25. WATER LINE								
Water line for site offices and for required process water.								
M MIL PL 4" (10cm) Galv Steel Pipe		23.72	0.24	8.00	0.00	0.00	31.96	
ASTM A-53, T&C, Sch 40	1000.00 LF	30,450	307	10,272	0	0	41,030	41.03
M MIL PL 4" 90 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4" 45 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4"Coupling,Straight 150# MI G		52.37	0.53	60.00	0.00	0.00	112.90	
alv	10.00 EA	672	7	770	0	0	1,450	144.96
M MIL PL 4"Nipple,Galv Stl Sch 40, 4"		17.96	0.18	20.00	0.00	0.00	38.14	
4"(10cm) Long	10.00 EA	231	2	257	0	0	490	48.97
M MIL PL 4" Iron Body Gate Valve, Thrd		84.65	0.71	800.00	0.00	0.00	885.36	
125# Bronze Mtd w/Threaded Va	1.00 EA	109	1	1,027	0	0	1,137	1136.78
M MIL PL 4"IB Swing Ck Vlv,Brz,Flg&125		195.19	1.79	400.00	0.00	0.00	596.98	
#	1.00 EA	251	2	514	0	0	767	766.50
M MIL PL 4" Flanged Backflow Preventer		183.48	1.68	3000.00	0.00	0.00	3185.16	
w/2Gate&2CK Vlv&Auto Dif Rlf	1.00 EA	236	2	3,852	0	0	4,090	4089.66
Vlv								
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de	1000.00 LF	367	1	51	0	0	420	0.42
(15cm)								
USR PL Chlorinate Water Line		126.97	1.07	50.00	0.00	0.00	178.04	
	1.00 JOB	163	1	64	0	0	229	228.60
MIL PL 4" Standard Fire Hydrant		359.13	3.62	927.18	0.00	0.00	1289.93	
One Piece w/5'(1.5M)Burial Se	2.00 EA	922	9	2,381	0	0	3,312	1656.24
cti								

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL Trench 1/2 CY Hyd Exc, Hvy Soil		1.88	0.83	0.00	0.00	0.00	2.71	
51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loader		1.09	0.46	0.00	0.00	0.00	1.55	
Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Plate		2.86	0.07	0.00	0.00	0.00	2.92	
(15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
TOTAL WATER LINE		38,549	942	21,474	0	0	60,965	
3300.15.05.30. PHONE								
USR AA Install Telephone Service		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PHONE		0	0	0	2,000	0	2,000	
3300.15.05.35. SEWER								
8" sewer, manholes and cleanouts for treated water discharge to POTW and for sanitary waste from offices.								
AIR PL 8" (20CM) Pipe Sch 40		8.98	0.09	6.28	0.00	0.00	15.35	
	1000.00 FT	11,528	116	8,063	0	0	19,707	19.71
AIR PL 8" ABS-PVC (1/4 Bend)		39.28	0.40	64.19	0.00	0.00	103.87	
	10.00 EA	504	5	824	0	0	1,334	133.36
AIR PL 8" ABS-PVC (1/8 Bend)		39.28	0.40	51.18	0.00	0.00	90.86	
	10.00 EA	504	5	657	0	0	1,167	116.66
AIR PL 8" ABS-PVC Wye, Standard		52.37	0.53	40.00	0.00	0.00	92.90	
	10.00 EA	672	7	514	0	0	1,193	119.28
AIR PL 8" ABS-PVC Clean Out Tee w/Plug		165.05	1.90	109.00	0.00	0.00	275.96	
	10.00 EA	2,119	24	1,400	0	0	3,543	354.32
MIL PL 4'Dia x 6'Deep Precast Manhole		381.35	48.51	233.65	0.00	0.00	663.51	
8"(20cm)Tk, (1.2M)Dia x (1.8M)Dp	4.00 EA	1,959	249	1,200	0	0	3,408	851.93
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de	1000.00 LF	367	1	51	0	0	420	0.42
(15cm)								
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il	300.00 CY	724	320	0	0	0	1,044	3.48
51 CY/Hr (40M3)/Hr								
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der	390.00 CY	545	229	0	0	0	774	1.99
Without Compaction								
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate	390.00 CY	1,430	33	0	0	0	1,463	3.75
(15cm) Layers								
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL SEWER		21,461	1,003	12,812	25,680	0	60,955	
3300.15.05.40. ELECTRICAL SERVICE								
USR AA Install New 480 3PH Service		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 JOB	0	0	0	20,000	0	20,000	20000.00
TOTAL ELECTRICAL SERVICE		0	0	0	20,000	0	20,000	
3300.15.05.45. GAS SERVICE								
Gas service to provide boiler gas and temporary heating of buildings if needed.								
M MIL PL 8"Dia Sched 40 Stl Gas Dist L		16.69	3.99	15.00	0.00	0.00	35.68	
ine	1000.00 LF	21,429	5,129	19,260	0	0	45,818	45.82
(20cm)Dia Plain End, Tar Coated								
MIL PL 12",150,000 CF/Hr Gas Turb Me		1142.67	11.53	20054.00	0.00	0.00	21208.20	
ter	1.00 EA	1,467	15	25,749	0	0	27,231	27230.80
175 PSI, Direct Digital, Flanged								
B MIL PL 8"(10cm) Gas Pressure Regulat		458.69	4.21	1200.00	0.00	0.00	1662.90	
or	1.00 EA	589	5	1,541	0	0	2,135	2135.12
Flanged End								

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
B MIL PL 8" Iron Body Gate Valve, Gas		628.47	6.34	1200.00	0.00	0.00	1834.81	
Service	1.00 EA	807	8	1,541	0	0	2,356	2355.85
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL GAS SERVICE		27,362	5,741	48,141	25,680	0	106,925	
TOTAL TEMPORARY FACILITIES	1.00 JOB	93,540	9,928	84,307	73,359	0	261,135	261135.16
3300.15.08. SIGNS, BARRICADES								
3300.15.08. 5. SIGNS								
USR AA Jobsite Signs		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
USR AA Hazard Warning Signs		0.00	0.00	0.00	1000.00	0.00	1000.00	
	1.00 LS	0	0	0	1,000	0	1,000	1000.00
TOTAL SIGNS	20.00 EA	0	0	0	3,000	0	3,000	150.00
3300.15.08.10. BARRICADES/TEMP FENCING								
CIV AA Stl Post, 10'OC f/4' Snow Fen		2.05	0.03	0.99	0.00	0.00	3.07	
ce	400.00 LF	822	10	396	0	0	1,227	3.07
TOTAL BARRICADES/TEMP FENCING	1.00 JOB	822	10	396	0	0	1,227	1227.36

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.08.15. EROSION CONTROL									
Assume silt fence on downstream side of all trenches and building excavations.									
MIL AA Silt Fences, Vinyl, 3' High			2.05	0.01	1.22	0.00	0.00	3.28	
With 7.5' Posts	4000.00	LF	8,211	36	4,880	0	0	13,127	3.28
MIL AA TRENCHR,CHN, 24"DP,6"W,WLK-BE			0.00	2.08	0.00	0.00	0.00	2.08	
HND	32.00	HR	0	67	0	0	0	67	2.08
USR AA Silt Fence Removal			0.96	0.00	0.00	0.00	0.00	0.97	
	4000.00	LF	3,849	17	0	0	0	3,866	0.97
USR AA Silt Fence Disposal (Dumpster			0.00	0.00	0.00	0.00	0.25	0.25	
)	4000.00	LF	0	0	0	0	1,000	1,000	0.25
MIL AA Foreman			38.89	0.00	0.00	0.00	0.00	38.89	
	32.00	HR	1,244	0	0	0	0	1,244	38.89
USR AA Maintain Silt Fences			38.39	0.00	0.00	0.00	0.00	38.39	
	80.00	HR	3,071	0	0	0	0	3,071	38.39
USR AA Dump Truck and Driver			0.00	0.00	0.00	50.00	0.00	50.00	
	16.00	HR	0	0	0	800	0	800	50.00
TOTAL EROSION CONTROL	1.00	JOB	16,376	119	4,880	800	1,000	23,175	23174.96
3300.15.08.20. STREET CLEANING									
MIL AA Skid Loader (Bobcat) w/Sweepe			0.00	17.93	0.00	0.00	0.00	17.93	
r	120.00	HR	0	2,151	0	0	0	2,151	17.93
Attachment									
TOTAL STREET CLEANING	1.00	JOB	0	2,151	0	0	0	2,151	2151.26
3300.15.08.25. DUST CONTROL									
MIL AA Water Truck			0.00	0.00	0.00	50.00	0.00	50.00	
	1000.00	HR	0	0	0	50,000	0	50,000	50.00
TOTAL DUST CONTROL	1.00	JOB	0	0	0	50,000	0	50,000	50000.00
TOTAL SIGNS, BARRICADES	1.00	JOB	17,197	2,281	5,276	53,800	1,000	79,554	79553.58

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.10. GRAVEL CAP Gravel cap for working surface fro site is 472,868 sq. ft. and 6" thick.								
L MIL AA Gravel Surfacing, Delivered		0.73	1.21	19.79	0.00	0.00	21.74	
	11384 CY	8,363	13,826	225,322	0	0	247,511	21.74
TOTAL GRAVEL CAP	10.80 ACR	8,363	13,826	225,322	0	0	247,511	22917.68
3300.15.15. ASPHALT CAP Asphalt cap is 4" of bituminous concrete surfacing over gravel subbase and covers 38,000 sft in part of CPA.								
MIL PV Crushed Stone Paving, Large A		1.54	0.47	0.34	0.00	0.00	2.35	
rea	4222.00 SY	8,363	2,568	1,820	0	0	12,752	3.02
Prepare and Roll Subbase								
B MIL PV Bituminous Hot Mix Intrm Cour		35.94	9.37	45.00	0.00	0.00	90.31	
se	700.00 TON	32,303	8,422	40,445	0	0	81,171	115.96
3954#/CY (2349Kg/M3),Ctrl Plant								
TOTAL ASPHALT CAP	4222.00 SY	40,667	10,990	42,266	0	0	93,922	22.25
3300.15.92. SURVEYS								
3300.15.92. 5. INITIAL LAYOUT SURVEY								
USR AA Survey Pipelines		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
USR AA General Survey for Controls		0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00 DAY	0	0	0	10,000	0	10,000	1000.00
USR AA Survey Report and Plots		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Facility Layout Survey		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL INITIAL LAYOUT SURVEY	1.00 JOB	0	0	0	24,000	0	24,000	24000.00
3300.15.92.10. SURVEY CONTROLS Controls & QC check during construction								
USR AA Survey Crew, 3 man		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL SURVEY CONTROLS	1.00 JOB	0	0	0	5,000	0	5,000	5000.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SURVEYS	1.00	JOB	0	0	0	29,000	0	29,000	29000.00
3300.15.97. MEETINGS									
3300.15.97.01. Preconstruction Meeting									
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	16.00	HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist III; Lead Engineer			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	10.00	HR	913	0	0	0	0	913	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	400.00	MI	0	0	0	0	140	140	0.35
USR AA M&IE; 3 each for 1/2 day and 1 for full day =2.5 days			0.00	0.00	0.00	0.00	42.00	42.00	
	2.50	DAY	0	0	0	0	105	105	42.00
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	1.00	EA	0	0	0	0	500	500	500.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Parking Airports			0.00	0.00	0.00	0.00	10.00	10.00	
	1.00	EA	0	0	0	0	10	10	10.00
USR AA Lodging			0.00	0.00	0.00	0.00	76.00	76.00	
	1.00	DAY	0	0	0	0	76	76	76.00
TOTAL Preconstruction Meeting	1.00	JOB	5,072	0	0	0	969	6,041	6040.88

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.97.03. Coordination Meeting								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	160.00 MI	0	0	0	0	56	56	0.35
USR AA M&IE; 3 each for 1/2 day and		0.00	0.00	0.00	0.00	42.00	42.00	
1	2.50 DAY	0	0	0	0	105	105	42.00
for full day =2.5 days								
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00
USR AA Lodging		0.00	0.00	0.00	0.00	76.00	76.00	
	1.00 DAY	0	0	0	0	76	76	76.00
TOTAL Coordination Meeting	1.00 JOB	3,010	0	0	0	2,385	5,395	5394.60
TOTAL MEETINGS	2.00 EA	8,081	0	0	0	3,354	11,435	5717.74
TOTAL MOBE, SITE WORK, TEMP FACILIT	1.00 JOB	180,282	43,114	357,171	156,159	5,638	742,364	742364.33

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20. TREATMENT SYSTEM CONSTRUCTION								
3300.20.01. TREATMENT PLANT BUILDING Steam Generation and GW treatment plant housed in temporary building (Sprung or Rubb type building) sized 200 ft x 100 ft. Assume air conditioned office to house computers and system controls equipment and operators. Building includes concrete slab. Demolition of these structures assumed after cool down and completion of groundwater pumping.								
USR AA Concrete		0.00	0.00	0.00	250.00	0.00	250.00	
	740.00 CY	0	0	0	185,000	0	185,000	250.00
USR AA Rubb Tent 200 x 100		0.00	0.00	0.00	10.00	0.00	10.00	
	20000 SFT	0	0	0	200,000	0	200,000	10.00
MIL AA Structural Fill		5.09	1.76	19.79	0.00	0.00	26.64	
	200.00 CY	1,018	352	3,959	0	0	5,329	26.64
TOTAL TREATMENT PLANT BUILDING	1.00 JOB	1,018	352	3,959	385,000	0	390,329	390328.54
3300.20.05. TREATMENT SYSTEM EQUIP. F&I								
3300.20.05. 5. EXPEDITOR/QC EQUIP. FABRICATION								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
-	200.00 HR	14,520	0	0	0	0	14,520	72.60
Starup/Proveout Project Manager								
USR AA Per Diem/M&IE		0.00	0.00	0.00	0.00	150.00	150.00	
	20.00 DAY	0	0	0	0	3,000	3,000	150.00
USR AA Airfare Trips		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	20.00 DAY	0	0	0	0	900	900	45.00
USR AA Taxi/Limo		0.00	0.00	0.00	0.00	20.00	20.00	
	4.00 EA	0	0	0	0	80	80	20.00
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00 JOB	14,520	0	0	0	5,980	20,500	20500.00
3300.20.05.01. EQUIP SUBMITTAL REVIEW								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	100.00 HR	10,340	0	0	0	0	10,340	103.40
ana								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	600.00 HR	35,640	0	0	0	0	35,640	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	40.00 HR	1,540	0	0	0	0	1,540	38.50
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	500.00 EA	0	0	0	1,500	0	1,500	3.00
USR AA Mail		0.00	0.00	0.00	12.00	0.00	12.00	
	50.00 EA	0	0	0	600	0	600	12.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00 JOB	47,520	0	0	2,100	0	49,620	49620.00
3300.20.05.10. EQUIPMENT PURCHASE/SHIPPING								
USR AA 21000 Gal Tank; Fresh water,		0.00	0.00	25000.00	0.00	0.00	25000.00	
Coelescing surge, Boiler surg e.	3.00 LS	0	0	75,000	0	0	75,000	25000.00
USR AA Oil Skimmer System		0.00	0.00	3500.00	0.00	0.00	3500.00	
	1.00 LS	0	0	3,500	0	0	3,500	3500.00
USR AA Water Softeners, (Waste to		0.00	0.00	120000.00	0.00	0.00	120000.00	
POTW)	1.00 LS	0	0	120,000	0	0	120,000	120000.00
USR AA Water Softener Backwash Sludg		0.00	0.00	5000.00	0.00	0.00	5000.00	
e	1.00 LS	0	0	5,000	0	0	5,000	5000.00
Collector Tank; Waste Salt								
USR AA 10,000 Gal Waste Salt Tank		0.00	0.00	12000.00	0.00	0.00	12000.00	
	1.00 LS	0	0	12,000	0	0	12,000	12000.00
USR AA Steam Boiler		0.00	0.00	275000.00	0.00	0.00	275000.00	
	2.00 LS	0	0	550,000	0	0	550,000	275000.00
USR AA CEMS System for Boiler Stack		0.00	0.00	75000.00	0.00	0.00	75000.00	
	2.00 EA	0	0	150,000	0	0	150,000	75000.00
USR AA Cogen Elec Generator (Steam		0.00	0.00	75000.00	0.00	0.00	75000.00	
Turbine)	4.00 EA	0	0	300,000	0	0	300,000	75000.00
USR AA Heat Exchanger Condensor		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Liquid/Vapor Separator		0.00	0.00	4000.00	0.00	0.00	4000.00	
	1.00 LS	0	0	4,000	0	0	4,000	4000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Vacuum Pump		0.00	0.00	100000.00	0.00	0.00	100000.00	
piping skid; butterfly valves; flexible piping; camlock connections complete.	1.00 LS	0	0	100,000	0	0	100,000	100000.00
USR AA Liquid Separator		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Air Dryer		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Freight		0.00	0.00	60000.00	0.00	0.00	60000.00	
	1.00 LS	0	0	60,000	0	0	60,000	60000.00
USR AA Heat Exchanger, Liquids from Extraction Wells		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 EA	0	0	30,000	0	0	30,000	30000.00
USR AA Liquid Cooling Tower		0.00	0.00	25000.00	0.00	0.00	25000.00	
	1.00 LS	0	0	25,000	0	0	25,000	25000.00
USR AA pH Adjust System		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Solids Holding Bin for Filter		0.00	0.00	5000.00	0.00	0.00	5000.00	
	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Flocculation System		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Coelescing Separator		0.00	0.00	150000.00	0.00	0.00	150000.00	
	1.00 LS	0	0	150,000	0	0	150,000	150000.00
USR AA IAF Separator		0.00	0.00	150000.00	0.00	0.00	150000.00	
	1.00 LS	0	0	150,000	0	0	150,000	150000.00
USR AA 40,000 Waste Water Holding Ta		0.00	0.00	50000.00	0.00	0.00	50000.00	
nk; Cone Bottom w/Skirts	1.00 LS	0	0	50,000	0	0	50,000	50000.00
USR AA Steam Regenerated Carbon Syst		0.00	0.00	125000.00	0.00	0.00	125000.00	
em (Vapor Ph)	1.00 LS	0	0	125,000	0	0	125,000	125000.00
USR AA Carbon Polishing Vessels (Vap		0.00	0.00	10000.00	0.00	0.00	10000.00	
or Phase)	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Multi Media Vessels		0.00	0.00	20000.00	0.00	0.00	20000.00	
	2.00 LS	0	0	40,000	0	0	40,000	20000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Steam Regenerated GAC System		0.00	0.00	20000.00	0.00	0.00	20000.00	
(Liquid Phase)	2.00 LS	0	0	40,000	0	0	40,000	20000.00
USR AA 600 SCFM Air Compressor with		0.00	0.00	40000.00	0.00	0.00	40000.00	
Dryer	1.00 LS	0	0	40,000	0	0	40,000	40000.00
USR AA Misc. Pumps, Valves, Fittings		0.00	0.00	100000.00	0.00	0.00	100000.00	
,	1.00 LS	0	0	100,000	0	0	100,000	100000.00
Conveyance Pipe & Instruments								
USR AA Spare Parts		0.00	0.00	100000.00	0.00	0.00	100000.00	
	1.00 LS	0	0	100,000	0	0	100,000	100000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Initital Chemical Supply		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
TOTAL EQUIPMENT PURCHASE/SHIPPING	1.00 JOB	0	0	2,340,500	0	0	2,340,500	2340500.00
3300.20.05.12. INSTRUMENTATION/CONTROLLERS								
USR AA I/O and Cabinet		0.00	0.00	25000.00	0.00	0.00	25000.00	
	1.00 LS	0	0	25,000	0	0	25,000	25000.00
USR AA Software and Processors		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Autodailer		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	480.00 HR	43,824	0	0	0	0	43,824	91.30
Instrument Engineer								
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	500.00 HR	36,300	0	0	0	0	36,300	72.60
TOTAL INSTRUMENTATION/CONTROLLERS	1.00 JOB	83,028	0	46,000	0	0	129,028	129028.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.13. COMPUTER								
USR AA Computer		0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00 EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software		0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00 EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support Plan		0.00	0.00	0.00	450.00	0.00	450.00	
	1.00 YR	0	0	0	450	0	450	450.00
USR AA Software Training		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II; O&M Project Manager		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	40.00 HR	3,168	0	0	0	0	3,168	79.20
TOTAL COMPUTER	1.00 JOB	6,072	0	5,300	4,450	0	15,822	15822.00
3300.20.05.15. EQUIPMENT INSTALLATION								
USR AA Crane Rental		0.00	0.00	0.00	4000.00	0.00	4000.00	
	2.00 WK	0	0	0	8,000	0	8,000	4000.00
USR AA Materials/Grout/Misc		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 JOB	0	0	20,000	0	0	20,000	20000.00
MIL AA Eq Oper, Medium		56.51	0.00	0.00	0.00	0.00	56.51	
	160.00 HR	9,041	0	0	0	0	9,041	56.51
MIL AA Laborer (Semi-Skilled)		38.39	0.00	0.00	0.00	0.00	38.39	
	480.00 HR	18,427	0	0	0	0	18,427	38.39
UPB AA FORK LIFT,R/T 8,000#,16.00'L -HT		0.00	11.94	0.00	0.00	0.00	11.94	
	160.00 HR	0	1,911	0	0	0	1,911	11.94
TOTAL EQUIPMENT INSTALLATION	1.00 JOB	27,468	1,911	20,000	8,000	0	57,378	57378.48
3300.20.05.16. TREATMENT SYSTEM ELECTRICAL & IN								
USR AA Electrical/Instrumentation Allowance		0.00	0.00	300000.00	0.00	0.00	300000.00	
	1.00 LS	0	0	300,000	0	0	300,000	300000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00 JOB	0	0	300,000	0	0	300,000	300000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.17. MECHANICAL								
USR AA Mechanical Subcontractor Pipi		0.00	0.00	0.00	20000.00	0.00	20000.00	
ng	1.00 JOB	0	0	0	20,000	0	20,000	20000.00
GW Treatment/Steam Systems								
USR AA Plumbing Building		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
USR AA HVAC		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
TOTAL MECHANICAL	1.00 JOB	0	0	0	50,000	0	50,000	50000.00
3300.20.05.20. SPH 6Ph HEATING COMPONENTS								
See backup for costs per Greg Beyke of Thermal Remediation Systems dated 6/14/01 Materials include cable, graphite, steel shot, shipping, hydrating solution, Electrodes, Electrode liquid conduit, and Electrode heads.								
USR AA Electrodes Materials & Shippi		0.00	0.00	3182.61	0.00	0.00	3182.61	
ng	44.00 EA	0	0	140,035	0	0	140,035	3182.61
USR AA Power Control System for		0.00	0.00	0.00	600485.00	0.00	600485.00	
Electrodes Purchase & Mobe	1.00 EA	0	0	0	600,485	0	600,485	600485.00
USR AA Power Control System Salvage		0.00	0.00	-87975.00	0.00	0.00	-87975.00	
Value	1.00 EA	0	0	-87,975	0	0	-87,975	-87975.00
USR AA Abovegrade Cables & ERH Syste		0.00	0.00	1187.00	0.00	0.00	1187.00	
m	44.00 EA	0	0	52,228	0	0	52,228	1187.00
Materials								
USR AA Cable Salvage Value		0.00	0.00	-11178.00	0.00	0.00	-11178.00	
	1.00 EA	0	0	-11,178	0	0	-11,178	-11178.00
USR AA TRS On-Site Installation		0.00	0.00	0.00	106.00	0.00	106.00	
Training/Supervision	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA TRS Travel/Per Diems		0.00	0.00	0.00	10900.00	0.00	10900.00	
	1.00 LS	0	0	0	10,900	0	10,900	10900.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	133.00	0.00	133.00	
	54.00 HR	0	0	0	7,182	0	7,182	133.00
USR AA Electrode Connection Labor		0.00	0.00	0.00	101.00	0.00	101.00	
	115.00 HR	0	0	0	11,615	0	11,615	101.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCS Testing		0.00	0.00	0.00	106.00	0.00	106.00	
	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA Supervising Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	6.00 HR	0	0	0	858	0	858	143.00
TOTAL SPH 6Ph HEATING COMPONENTS	1.00 JOB	0	0	93,110	648,000	0	741,110	741109.84
3300.20.05.25. VEA & DPT COMPONENTS								
USR AA Electrode Arrays		0.00	0.00	15.00	0.00	0.00	15.00	
	8560.00 LFT	0	0	128,400	0	0	128,400	15.00
USR AA Data Collection Equipment		0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Fiber Optic Cable		0.00	0.00	2.50	0.00	0.00	2.50	
	8560.00 LFT	0	0	21,400	0	0	21,400	2.50
TOTAL VEA & DPT COMPONENTS	1.00 JOB	0	0	219,800	0	0	219,800	219800.00
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00 JOB	178,608	1,911	3,024,710	712,550	5,980	3,923,758	3923758.32
3300.20.07. WELL INSTRUMENTS/CONTROLS								
3300.20.07.10. INSTRUMENT CABLE TO WELLHEADS								
MIL EL 6" Stl Cable Tray-Strt Sect,12' (15cm)w/ hangers & Supports		6.73	0.03	5.91	0.00	0.00	12.67	
	2000.00 LF	17,293	69	15,171	0	0	32,534	16.27
L MIL EL 12"Stl Cable Tray-Strt Sect,12' (31cm)w/ hangers & Supports		2.25	0.01	6.25	0.00	0.00	8.52	
	8000.00 LF	23,130	92	64,244	0	0	87,466	10.93
MIL EL 12"(31cm)Horz 90,Stl Cable Tray		79.01	0.32	38.68	0.00	0.00	118.01	
	20.00 EA	2,029	8	993	0	0	3,030	151.52
MIL EL 12"(31cm)Horz "T",Stl Cable Tray		166.80	0.67	70.24	0.00	0.00	237.71	
	165.00 EA	35,337	142	14,881	0	0	50,360	305.21
MIL EL 12"-6" Reducer,Steel Cable Tray		52.60	0.21	29.44	0.00	0.00	82.25	
	165.00 EA	11,143	45	6,238	0	0	17,425	105.61

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR EL Signal Wire			60.05	0.24	20.00	0.00	0.00	80.29	
	2000.00	KLF	154,198	618	51,359	0	0	206,175	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00	JOB	243,130	974	152,887	0	0	396,991	396991.28
3300.20.07.30. WELL INSTRUMENTATION									
USR AA Level Controller			63.49	0.57	600.00	0.00	0.00	664.05	
	124.00	EA	7,872	70	74,400	0	0	82,342	664.05
USR AA Pressure Indicator			63.49	0.57	1000.00	0.00	0.00	1064.05	
	278.00	EA	17,649	157	278,000	0	0	295,806	1064.05
USR AA Temperature Indicator			63.49	0.57	500.00	0.00	0.00	564.05	
	327.00	EA	20,760	185	163,500	0	0	184,445	564.05
USR AA Steam Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	165.00	EA	20,950	187	247,500	0	0	268,637	1628.10
USR AA Water Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	6.00	EA	762	7	9,000	0	0	9,769	1628.10
USR AA Vapor Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	114.00	EA	14,475	129	171,000	0	0	185,604	1628.10
USR AA Amperage Meter			126.97	1.13	500.00	0.00	0.00	628.10	
	44.00	EA	5,587	50	22,000	0	0	27,636	628.10
TOTAL WELL INSTRUMENTATION	1.00	JOB	88,055	784	965,400	0	0	1,054,238	1054238.49
3300.20.07.35. VERTICAL ELECTRODE ARRAYS									
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	40.00	0.00	40.00	
Grouting, Vertical	8560.00	LFT	0	0	0	342,400	0	342,400	40.00
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	50.00	0.00	50.00	
Grouting, Horizontal in Sloug h	2600.00	LFT	0	0	0	130,000	0	130,000	50.00
USR AA Horizontal Drill Subcontracto			0.00	0.00	0.00	100.00	0.00	100.00	
r Mobe/Demobe	1.00	LS	0	0	0	100	0	100	100.00
TOTAL VERTICAL ELECTRODE ARRAYS	38.00	EA	0	0	0	472,500	0	472,500	12434.21

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.07.40. ELECTRICAL POWER TO WELLS								
AIR EL 2" R.S. Conduit w/Coupling &		6.65	0.03	2.03	0.00	0.00	8.71	
Supp.	3000.00 LF	25,598	116	7,819	0	0	33,533	11.18
AIR EL 3" R.S. Conduit w/Coupling &		7.31	0.03	4.10	0.00	0.00	11.44	
Supp.	3000.00 LF	28,158	128	15,793	0	0	44,078	14.69
AIR EL 1" R.S. Conduit w/Coupling &		4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	3000.00 LF	16,117	73	3,659	0	0	19,849	6.62
CIV EL 1/4" Nylon Pull Cord Installe		0.29	0.00	0.39	0.00	0.00	0.68	
d	30000 LF	11,101	46	14,903	0	0	26,051	0.87
Cable Installation Methods								
MIL EL No 12-Type THWN		159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	10.00 MLF	2,046	9	986	0	0	3,041	304.13
MIL EL No 8-Type THWN		264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	10.00 MLF	3,395	15	2,948	0	0	6,359	635.88
MIL EL No 10-Type THWN		200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	10.00 MLF	2,574	12	1,582	0	0	4,168	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00 JOB	88,987	400	47,692	0	0	137,079	137079.19
TOTAL WELL INSTRUMENTS/CONTROLS	1.00 JOB	420,172	2,158	1,165,978	472,500	0	2,060,809	2060808.96

3300.20.10. INSTALL WELLS

3300.20.10. 5. EXTRACTION WELLS THERMAL

Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,

Mobile NAPL Extraction wells are included in this section.

3300.20.10. 5. 5. "A" ZONE WELLS

USR AA Extraction Wells, Thermal		0.00	0.00	0.00	135.00	0.00	135.00	
	420.00 LFT	0	0	0	56,700	0	56,700	135.00
TOTAL "A" ZONE WELLS	1.00 JOB	0	0	0	56,700	0	56,700	56700.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.10. "B" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	6935.00	LFT	0	0	0	936,225	0	936,225	135.00
USR AA Additional Cost Wells in Slou gh Drilled w/Barge			0.00	0.00	0.00	5000.00	0.00	5000.00	
	7.00	EA	0	0	0	35,000	0	35,000	5000.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	971,225	0	971,225	971225.00
3300.20.10. 5.15. "C" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	2126.00	LFT	0	0	0	287,010	0	287,010	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	287,010	0	287,010	287010.00
3300.20.10. 5.20. "D" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	4345.00	LFT	0	0	0	586,575	0	586,575	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	586,575	0	586,575	586575.00
3300.20.10. 5.25. "E" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	1375.00	LFT	0	0	0	185,625	0	185,625	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	185,625	0	185,625	185625.00
3300.20.10. 5.30. EXTRACTION PUMPS									
USR AA Extraction Pumps Incl Controllers			0.00	0.00	2500.00	0.00	0.00	2500.00	
	118.00	EA	0	0	295,000	0	0	295,000	2500.00
USR AA Extraction Pumps Incl Controllers; Top Loading for LNA			0.00	0.00	2700.00	0.00	0.00	2700.00	
	20.00	EA	0	0	54,000	0	0	54,000	2700.00
USR AA 600 SCFM Compressor to run pu mps			0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00	EA	0	0	40,000	0	0	40,000	40000.00
USR AA Discharge Tubing Pump to Wellhead; SS			0.00	0.00	11.00	0.00	0.00	11.00	
	14960	LFT	0	0	164,560	0	0	164,560	11.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Air Supply Tubing Wellhead to		0.00	0.00	6.00	0.00	0.00	6.00	
Pumps	14960 LFT	0	0	89,760	0	0	89,760	6.00
USR AA Pulse Counters w/ 4-20 ma Sig		0.00	0.00	395.00	0.00	0.00	395.00	
nal	142.00 EA	0	0	56,090	0	0	56,090	395.00
USR AA Liquid Level Measurment,		0.00	0.00	1000.00	0.00	0.00	1000.00	
Portable Magnabelic	1.00 EA	0	0	1,000	0	0	1,000	1000.00
USR AA Downwell Liquid Level Bubbler		0.00	0.00	2.00	0.00	0.00	2.00	
Tube	14000 LFT	0	0	28,000	0	0	28,000	2.00
USR AA Spare Parts; Initial Supply f		0.00	0.00	1000.00	0.00	0.00	1000.00	
or	1.00 LS	0	0	1,000	0	0	1,000	1000.00
Pumps								
USR AA Connection Fittings; Air &		0.00	0.00	200.00	0.00	0.00	200.00	
Discharg Tubing/Manifolds, Et	138.00 EA	0	0	27,600	0	0	27,600	200.00
c.								
USR AA 70 GPM Turbine Pump, High Hea		0.00	0.00	25000.00	0.00	0.00	25000.00	
d	5.00 EA	0	0	125,000	0	0	125,000	25000.00
TOTAL EXTRACTION PUMPS	147.00 EA	0	0	882,010	0	0	882,010	6000.07
3300.20.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps		0.00	0.00	0.00	725.00	0.00	725.00	
	143.00 EA	0	0	0	103,675	0	103,675	725.00
USR AA Install Down-hole Instruments		0.00	0.00	0.00	450.00	0.00	450.00	
	246.00 EA	0	0	0	110,700	0	110,700	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	147.00 EA	0	0	0	214,375	0	214,375	1458.33
3300.20.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	123.00 EA	0	0	0	30,750	0	30,750	250.00
TOTAL WELL TOP COMPLETION	124.00 EA	0	0	0	30,750	0	30,750	247.98

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	123.00	EA	0	0	0	123,000	0	123,000	1000.00
TOTAL WELL DEVELOPMENT	124.00	EA	0	0	0	123,000	0	123,000	991.94
TOTAL EXTRACTION WELLS THERMAL	1.00	JOB	0	0	882,010	2,455,260	0	3,337,270	3337270.00
3300.20.10.10. STEAM INJECTION WELLS									
Injection well pricing includes development, handling of cuttings and liquid wastes,									
3300.20.10.10. 5. "A" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	3180.00	LFT	0	0	0	429,300	0	429,300	135.00
TOTAL "A" ZONE WELLS	1.00	JOB	0	0	0	429,300	0	429,300	429300.00
3300.20.10.10.10. "B" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	5130.00	LFT	0	0	0	692,550	0	692,550	135.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	692,550	0	692,550	692550.00
3300.20.10.10.15. "C" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	2119.00	LFT	0	0	0	286,065	0	286,065	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	286,065	0	286,065	286065.00
3300.20.10.10.20. "D" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	6417.00	LFT	0	0	0	866,295	0	866,295	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	866,295	0	866,295	866295.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.10.25. "E" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	2828.00	LFT	0	0	0	381,780	0	381,780	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	381,780	0	381,780	381780.00
3300.20.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	165.00	EA	0	0	0	268,125	0	268,125	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	268,125	0	268,125	268125.00
3300.20.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	165.00	EA	0	0	0	41,250	0	41,250	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	41,250	0	41,250	41250.00
3300.20.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	165.00	EA	0	0	0	165,000	0	165,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	165,000	0	165,000	165000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	3,130,365	0	3,130,365	3130365.00
3300.20.10.15. REINJECTION WELLS									
3300.20.10.15.25. "E" ZONE WELLS									
USR AA Reinjection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	840.00	LFT	0	0	0	113,400	0	113,400	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	113,400	0	113,400	113400.00
3300.20.10.15.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	3.00	EA	0	0	0	4,875	0	4,875	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	4,875	0	4,875	4875.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.15.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	3.00	EA	0	0	0	750	0	750	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	750	0	750	750.00
3300.20.10.15.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	3.00	EA	0	0	0	3,000	0	3,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	3,000	0	3,000	3000.00
TOTAL REINJECTION WELLS	1.00	JOB	0	0	0	122,025	0	122,025	122025.00
3300.20.10.20. MONITORING WELLS									
3300.20.10.20. 5. INSTALL WELLS									
USR AA Install 4" Monitoring Wells,			0.00	0.00	0.00	100.00	0.00	100.00	
SS	5580.00	LFT	0	0	0	558,000	0	558,000	100.00
Casing and Screens									
TOTAL INSTALL WELLS	39.00	EA	0	0	0	558,000	0	558,000	14307.69
3300.20.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT									
M AIR AA Lo Flo Pump & Teflon Tubing			0.00	0.00	550.00	0.00	0.00	550.00	
	25.00	EA	0	0	13,750	0	0	13,750	550.00
USR AA Portable Air Compressor			0.00	0.00	1835.00	0.00	0.00	1835.00	
	1.00	EA	0	0	1,835	0	0	1,835	1835.00
USR AA Misc Tools & Sampling Equipme			0.00	0.00	1000.00	0.00	0.00	1000.00	
nt	1.00	EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and			0.00	0.00	0.00	100.00	0.00	100.00	
Discharge/Sampling System	25.00	EA	0	0	0	2,500	0	2,500	100.00
USR AA Sample Pump Tubing, Teflon Li			0.00	0.00	3.50	0.00	0.00	3.50	
ned	3600.00	LFT	0	0	12,600	0	0	12,600	3.50
USR AA Slip On Well Cap Assbly			0.00	0.00	65.00	0.00	0.00	65.00	
	25.00	EA	0	0	1,625	0	0	1,625	65.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Flexible Discharge Tubing			0.00	0.00	23.00	0.00	0.00	23.00	
Adaptor	25.00	EA	0	0	575	0	0	575	23.00
USR AA Digital Cycle Controller for			0.00	0.00	2240.00	0.00	0.00	2240.00	
Lo	1.00	EA	0	0	2,240	0	0	2,240	2240.00
Flow Bladder Pump									
USR AA Multi-parameter Flow Cell &			0.00	0.00	4495.00	0.00	0.00	4495.00	
Meter	1.00	EA	0	0	4,495	0	0	4,495	4495.00
USR AA Liquid Level Measurment/Drawd			0.00	0.00	815.00	0.00	0.00	815.00	
own	1.00	EA	0	0	815	0	0	815	815.00
Meter									
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	38,935	2,500	0	41,435	41435.00
3300.20.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole			0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	78.00	EA	0	0	0	126,750	0	126,750	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	126,750	0	126,750	126750.00
3300.20.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pi			0.00	0.00	0.00	250.00	0.00	250.00	
pe	39.00	EA	0	0	0	9,750	0	9,750	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	9,750	0	9,750	9750.00
3300.20.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	39.00	EA	0	0	0	39,000	0	39,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	39,000	0	39,000	39000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	38,935	736,000	0	774,935	774935.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.25. TREAT WELL DRILL LIQUIDS/CUTTING								
During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.								
The liquiids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.								
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	180.00 EA	0	0	0	72,000	0	72,000	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	40.00 MO	0	40,000	0	0	0	40,000	1000.00
USR AA Treat Contaminated Water		0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	700000 GAL	0	0	0	175,000	0	175,000	0.25
USR AA Onsite Steam Strip Drill		1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	3600.00 TON	6,480	113	0	0	198,000	204,593	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.70 MGL	0	0	0	62,331	0	62,331	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.70 MGL	0	0	0	10,126	0	10,126	14465.00
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.20 KLB	0	0	0	7,742	0	7,742	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.30 KLB	0	0	0	5,241	0	5,241	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	6,480	40,113	0	332,647	198,000	577,240	577239.88
3300.20.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW8310)	22.00 EA	0	0	0	3,542	0	3,542	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	22.00 EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	9,416	0	9,416	9416.00

3300.20.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	66.00 EA	0	0	0	9,240	0	9,240	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	66.00 EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	66.00 EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600		0.00	0.00	0.00	55.00	0.00	55.00	
	66.00 EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	11.00 EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00 JOB	0	0	0	36,190	0	36,190	36190.00

3300.20.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	1200.00 HR	71,280	0	0	0	0	71,280	59.40
USR AA Engineer/Scientist IV, Sampling Lead		59.40	0.00	0.00	0.00	0.00	59.40	
	120.00 HR	7,128	0	0	0	0	7,128	59.40

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Technician/Analyst IV, Sampli ng Tech			33.00	0.00	0.00	0.00	0.00	33.00	
	120.00	HR	3,960	0	0	0	0	3,960	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	16.00	HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car office.			0.00	0.00	0.00	0.00	0.31	0.31	
	600.00	MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging Mgr and HSO.			0.00	0.00	0.00	0.00	198.00	198.00	
	10.00	DAY	0	0	0	0	1,980	1,980	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	10.00	DAY	0	0	0	0	420	420	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	400.00	LFT	0	0	1,000	0	0	1,000	2.50
USR AA Misc Sampling Equipment/Materials			0.00	0.00	400.00	0.00	0.00	400.00	
	1.00	LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00	JOB	86,909	0	1,400	50	3,134	91,493	91492.80
TOTAL INSTALL WELLS	1.00	JOB	93,389	40,113	922,345	6,821,953	201,134	8,078,934	8078933.68

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15. PIPING								
3300.20.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	3000.00 LF	22,867	535	18,174	0	0	41,575	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40		9.62	0.52	8.92	0.00	0.00	19.06	
A53	3000.00 LF	37,061	1,995	34,345	0	0	73,400	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40		5.94	0.14	7.18	0.00	0.00	13.26	
A53	1000.00 LF	7,622	178	9,222	0	0	17,023	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std		360.80	19.42	125.85	0.00	0.00	506.07	
Wt	30.00 EA	13,898	748	4,847	0	0	19,493	649.78
MIL PL 6" 90 Degree LR Weld Ell, Std		274.51	6.42	67.81	0.00	0.00	348.74	
Wt	20.00 EA	7,049	165	1,741	0	0	8,956	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	1300.00 LF	13,212	309	5,457	0	0	18,978	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	380.00 EA	81,155	1,898	13,454	0	0	96,507	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	124.00 EA	5,041	118	430	0	0	5,589	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	620.00 EA	47,257	1,105	20,459	0	0	68,822	111.00
AIR AA Slip On Flange 6"		158.30	3.70	40.70	0.00	0.00	202.71	
	40.00 EA	6,332	148	1,628	0	0	8,108	202.71
MIL PL 8" Weld Neck Flange, 150#		156.02	8.40	100.07	0.00	0.00	264.49	
	40.00 EA	8,013	431	5,139	0	0	13,584	339.59
MIL PL 4" x 3" Reducer, Eccentric		166.64	3.90	26.44	0.00	0.00	196.98	
	248.00 EA	53,061	1,241	8,421	0	0	62,723	252.91
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	5.00 EA	535	13	74	0	0	621	124.24

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	744.00 EA	95,510	909	7,196	0	0	103,615	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S		118.73	1.13	11.91	0.00	0.00	131.77	
ets	40.00 EA	6,098	58	612	0	0	6,767	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S		118.73	1.13	13.30	0.00	0.00	133.16	
ets	40.00 EA	6,098	58	683	0	0	6,839	170.97
USR PL Pipe Supports		59.36	1.39	200.00	0.00	0.00	260.75	
	533.00 EA	40,626	950	136,872	0	0	178,448	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate		256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	4.00 EA	1,317	13	3,123	0	0	4,454	1113.50
125 #								
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate		224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	4.00 EA	1,153	12	1,878	0	0	3,042	760.56
125 #								
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate		114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	248.00 EA	36,515	335	70,898	0	0	107,747	434.46
125 #								
USR PL Fit/Cut/Weld 4" pipe to 6" or		237.46	5.55	0.00	0.00	0.00	243.01	
8"	124.00 EA	37,806	884	0	0	0	38,690	312.02
(No Tees required)								
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe		3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	3000.00 LF	15,044	103	9,630	0	0	24,776	8.26
s								
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv		3.91	0.03	1.00	0.00	0.00	4.93	
r	1000.00 LF	5,015	34	1,284	0	0	6,333	6.33
w/Fire Retardant Jackets								
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co		7.81	0.05	1.00	0.00	0.00	8.86	
ver	3000.00 LF	30,087	206	3,852	0	0	34,145	11.38
w/Fire Retardant Jackets								
L MIL PL 0.006" Alum Insul Jacket w/Ba		6.25	0.04	0.16	0.00	0.00	6.45	
nds	9400.00 SF	75,419	515	1,900	0	0	77,834	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00 JOB	653,789	12,962	361,318	0	0	1,028,069	1028068.80

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.10. LIQUID RECOVERY SYSTEM								
AIR PL Pipe, Iron, Threaded, Sch 80		7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	3000.00 LF	29,447	270	23,882	0	0	53,599	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	5000.00 LF	50,815	1,188	20,988	0	0	72,991	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std		96.23	2.25	16.68	0.00	0.00	115.16	
Wt	20.00 EA	2,471	58	428	0	0	2,957	147.86
MIL PL 3"Tee,Full Size Butt Weld Std		143.91	3.37	36.78	0.00	0.00	184.06	
Wt	20.00 EA	3,696	86	944	0	0	4,726	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	372.00 EA	15,122	354	1,289	0	0	16,766	45.07
AIR PL Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	744.00 EA	75,612	1,768	19,297	0	0	96,677	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	496.00 EA	30,245	288	2,480	0	0	33,013	66.56
M MIL PL 3" Bronze 125# Gate Valve		70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	10.00 EA	906	8	1,226	0	0	2,141	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc		23.09	0.19	25.86	0.00	0.00	49.14	
rd	124.00 EA	3,676	31	4,117	0	0	7,823	63.09
Lubricated,Wrench Oper w/Wrench								
M MIL PL 2" Single Disc Type Check Val		37.62	0.33	72.27	0.00	0.00	110.23	
ve	124.00 EA	5,990	53	11,506	0	0	17,549	141.53
IB Wafer Type- 125#								
M MIL PL 2" Bronze 125# Gate Valve		46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	248.00 EA	14,702	124	10,088	0	0	24,914	100.46
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover		4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	3000.00 LF	17,317	118	3,830	0	0	21,265	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	5000.00 LF	30,507	209	7,924	0	0	38,640	7.73
w/Fire Retardant Jackets								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL 0.006" Alum Insul Jacket w/Ba			7.81	0.05	0.16	0.00	0.00	8.02	
nds	2200.00	SF	22,064	151	445	0	0	22,660	10.30
USR AA Flexible Hose; SS; 5' long; 2			14.84	0.35	150.00	0.00	0.00	165.19	
" dia.	144.00	EA	2,137	50	21,600	0	0	23,787	165.19
TOTAL LIQUID RECOVERY SYSTEM	1.00	JOB	308,654	4,792	130,045	0	0	443,490	443490.15

3300.20.15.11. EXTRACTION WELLHEAD SPOOL/FTG
Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho			474.91	11.11	350.00	0.00	0.00	836.02	
p Fabricated)	124.00	EA	58,889	1,377	43,400	0	0	103,666	836.02
USR AA Connection Fittings; Air &			118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La bor	144.00	EA	17,097	400	0	0	0	17,497	121.50
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00	JOB	75,986	1,777	43,400	0	0	121,163	121162.79

3300.20.15.15. STEAM INJECTION SYSTEM

3300.20.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40			8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	5000.00	LF	57,638	582	43,408	0	0	101,628	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac			52.37	0.53	50.23	0.00	0.00	103.13	
k	50.00	EA	3,362	34	3,225	0	0	6,621	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	165.00	EA	6,708	157	572	0	0	7,436	45.07
MIL PL 4" Tee, Red Out Butt Weld Std			249.95	5.85	51.39	0.00	0.00	307.19	
Wt	165.00	EA	52,954	1,238	10,888	0	0	65,081	394.43
AIR AA Slip On Flange 4"			105.54	2.47	25.70	0.00	0.00	133.70	
	170.00	EA	17,941	420	4,369	0	0	22,730	133.70

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	170.00	EA	21,823	208	1,644	0	0	23,675	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En			306.39	2.92	244.12	0.00	0.00	553.44	
ds	20.00	EA	7,868	75	6,269	0	0	14,212	710.60
Bellows w/Int Sleeves&Ext Covers									
MIL PL Pipe Support			76.64	1.58	27.24	0.00	0.00	105.46	
	500.00	EA	49,204	1,012	17,485	0	0	67,701	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	20.00	EA	869	7	1,123	0	0	2,000	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov			5.10	0.03	1.59	0.00	0.00	6.73	
er	5000.00	LF	32,748	224	10,235	0	0	43,208	8.64
w/Fire Retardant Jackets									
MIL PL 0.006" Alum Insul Jacket w/Ba			8.93	0.06	0.16	0.00	0.00	9.15	
nds	2500.00	SF	28,655	196	505	0	0	29,356	11.74
TOTAL MAIN HEADER PIPING	1.00	JOB	279,771	4,153	99,724	0	0	383,647	383647.27
3300.20.15.15.10. LATERAL PIPING									
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	3300.00	LF	33,538	784	13,852	0	0	48,174	14.60
AIR AA Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	1320.00	EA	104,480	2,444	26,664	0	0	133,588	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	1650.00	EA	100,612	958	8,251	0	0	109,821	66.56
MIL PL 3" Tee, Red Out Butt Weld Std			143.91	3.37	36.94	0.00	0.00	184.22	
Wt	20.00	EA	3,696	86	949	0	0	4,731	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En			263.84	2.51	209.44	0.00	0.00	475.79	
ds	165.00	EA	55,896	532	44,371	0	0	100,799	610.90
Bellows w/Int Sleeves&Ext Covers									
MIL PL 3" OD Snap-On Plastic Valve T			19.53	0.16	6.00	0.00	0.00	25.70	
ag	660.00	EA	16,554	139	5,083	0	0	21,775	32.99
Includes Insulation									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL NDT, X-Ray Welds of 3" Dia Pi			50.79	0.45	30.00	0.00	0.00	81.24	
pe	100.00	EA	6,521	58	3,852	0	0	10,431	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	20.00	EA	39,474	351	0	0	0	39,825	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov			4.75	0.03	1.23	0.00	0.00	6.02	
er	3300.00	LF	20,135	138	5,230	0	0	25,502	7.73
w/Fire Retardant Jackets									
M MIL PL 3" Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	330.00	EA	24,208	498	8,474	0	0	33,180	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di			61.16	0.56	56.88	0.00	0.00	118.60	
sc	330.00	EA	25,914	238	24,101	0	0	50,252	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer									
M MIL PL 3" Flg St Press Regul&Reducer			128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	165.00	EA	27,193	636	416,053	0	0	443,882	2690.19
Sgl Seat,Sprg Load Dir Act Diap									
M MIL PL 3" Twin Disc Type Check Valve			45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	165.00	EA	9,537	91	13,527	0	0	23,155	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T			25.39	0.21	18.68	0.00	0.00	44.29	
hrd	165.00	EA	5,380	45	3,958	0	0	9,383	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	4.00	EA	7,895	70	0	0	0	7,965	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	1000.00	EA	40,652	951	3,466	0	0	45,069	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	330.00	EA	14,346	121	18,528	0	0	32,995	99.99
TOTAL LATERAL PIPING	1.00	JOB	536,029	8,140	596,358	0	0	1,140,528	1140527.86

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	165.00	EA	39,180	916	82,500	0	0	122,596	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	39,180	916	82,500	0	0	122,596	122596.44
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	854,980	13,209	778,582	0	0	1,646,772	1646771.57
3300.20.15.20. H2O REINJECTION SYSTEM									
MIL PL 4" (10cm) Galv Steel Pipe			8.98	0.09	9.10	0.00	0.00	18.16	
ASTM A-53, T&C, Sch 40	1500.00	LF	17,291	174	17,517	0	0	34,983	23.32
MIL PL 2-1/2" (60mm) Galv Steel Pipe			5.73	0.05	4.64	0.00	0.00	10.43	
ASTM A-53, T&C, Sch 40	500.00	LF	3,681	34	2,980	0	0	6,695	13.39
MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	60.52	0.00	0.00	113.42	
v	10.00	EA	672	7	777	0	0	1,456	145.62
MIL PL 2-1/2"90 Degree Ell,150# MI G			36.70	0.34	20.80	0.00	0.00	57.84	
alv	10.00	EA	471	4	267	0	0	743	74.26
MIL PL 4" 45 Degree Ell, 150# MI Gal			52.37	0.53	69.20	0.00	0.00	122.10	
v	10.00	EA	672	7	889	0	0	1,568	156.78
MIL PL 2-1/2"45 Degree Ell,150# MI G			36.70	0.34	28.39	0.00	0.00	65.43	
alv	10.00	EA	471	4	365	0	0	840	84.00
MIL PL 4" Tee, Red Out 150# MI Galv			66.15	0.67	98.70	0.00	0.00	165.52	
	2.00	EA	170	2	253	0	0	425	212.52
MIL PL 4" Cap, 150# MI Galvanized			17.96	0.18	32.49	0.00	0.00	50.63	
	1.00	EA	23	0	42	0	0	65	65.00
MIL PL 2-1/2" Union, 150# MI Galvani			39.89	0.37	39.11	0.00	0.00	79.36	
zed	4.00	EA	205	2	201	0	0	408	101.90
MIL PL 2-1/2"Nipple,Galv Stl Sch 40,			12.23	0.11	8.79	0.00	0.00	21.13	
4"	10.00	EA	157	1	113	0	0	271	27.13
4"(10cm) Long									
MIL PL 4"Nipple,Galv Stl Sch 40, 4"			17.96	0.18	12.92	0.00	0.00	31.05	
4"(10cm) Long	10.00	EA	231	2	166	0	0	399	39.87

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4" Screwed Flange,Galv (125#			71.83	0.72	17.49	0.00	0.00	90.04	
CI)	4.00	EA	369	4	90	0	0	462	115.62
MIL PL 2-1/2"Scrd Flange,Galv (125#			42.28	0.39	10.00	0.00	0.00	52.66	
CI)	4.00	EA	217	2	51	0	0	270	67.61
MIL PL 4"Coupling,Straight 150# MI G			52.37	0.53	50.70	0.00	0.00	103.60	
alv	10.00	EA	672	7	651	0	0	1,330	133.02
MIL PL 2-1/2"Coupling,Strt 150# MI G			36.70	0.34	19.04	0.00	0.00	56.07	
alv	10.00	EA	471	4	244	0	0	720	72.00
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	6.00	EA	244	6	21	0	0	270	45.07
AIR AA 4" Weldolet			158.30	3.70	7.20	0.00	0.00	169.21	
	20.00	EA	3,166	74	144	0	0	3,384	169.21
M MIL PL Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	150.00	EA	11,004	226	3,852	0	0	15,082	100.55
AIR AA 2 1/2" Weldolet			105.54	2.47	4.90	0.00	0.00	112.90	
	20.00	EA	2,111	49	98	0	0	2,258	112.90
TOTAL H2O REINJECTION SYSTEM	1.00	JOB	42,299	610	28,720	0	0	71,630	71629.65
3300.20.15.25. STEAM GENERATION SYSTEM									
USR AA Mechanical Subcontractor F&I			0.00	0.00	0.00	20000.00	0.00	20000.00	
Steam Generation System Pipin	1.00	JOB	0	0	0	20,000	0	20,000	20000.00
g									
TOTAL STEAM GENERATION SYSTEM	1.00	JOB	0	0	0	20,000	0	20,000	20000.00
3300.20.15.30. WATER TREATMENT SYSTEM									
USR AA Mechanical Piping & Hookup			0.00	0.00	0.00	200000.00	0.00	200000.00	
Treatment System	1.00	JOB	0	0	0	200,000	0	200,000	200000.00
TOTAL WATER TREATMENT SYSTEM	1.00	JOB	0	0	0	200,000	0	200,000	200000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.35. AIR PIPING									
MIL PL 2"(50mm) A-53 Pipe, Sch 40			4.83	0.04	2.13	0.00	0.00	7.00	
Not Incl Hangers or Fittings	5000.00	LF	30,997	284	13,674	0	0	44,956	8.99
MIL PL 1"(25mm) A-53 Pipe, Sch 40			3.21	0.03	1.02	0.00	0.00	4.25	
Not Incl Hangers or Fittings	3000.00	LF	12,355	113	3,912	0	0	16,380	5.46
MIL PL 2" 90 Degree ELL,150# MI Blac			24.79	0.23	6.25	0.00	0.00	31.27	
k	50.00	EA	1,592	15	401	0	0	2,007	40.15
MIL PL 1" 90 Degree Ell, 150# MI Bla			15.29	0.14	1.96	0.00	0.00	17.39	
ck	300.00	EA	5,889	54	755	0	0	6,699	22.33
MIL PL 1" Coupling, Strt 150# MI Bla			15.29	0.14	2.29	0.00	0.00	17.72	
ck	100.00	EA	1,963	18	294	0	0	2,275	22.75
MIL PL 2" Coupling, Strt 150# MI Bla			24.79	0.23	5.68	0.00	0.00	30.70	
ck	50.00	EA	1,592	15	365	0	0	1,971	39.42
MIL PL 1" Union, 150# MI Black			20.85	0.19	5.68	0.00	0.00	26.72	
	600.00	EA	16,062	147	4,377	0	0	20,586	34.31
MIL PL 2" Union, 150# MI Black			36.70	0.34	12.09	0.00	0.00	49.12	
	50.00	EA	2,356	22	776	0	0	3,154	63.07
MIL PL 1" Nipple, Black Stl Sch 40,			7.06	0.06	0.59	0.00	0.00	7.72	
4"	300.00	EA	2,718	25	229	0	0	2,972	9.91
MIL PL 2" Nipple, Black Stl Sch 40,			9.86	0.09	1.19	0.00	0.00	11.14	
4"	50.00	EA	633	6	76	0	0	715	14.31
MIL PL 2" Tee, Red Out 150# MI Galv			36.70	0.34	13.41	0.00	0.00	50.45	
	300.00	EA	14,135	130	5,167	0	0	19,432	64.77
MIL PL 1" Tee, Straight 150# MI Galv			20.85	0.19	3.66	0.00	0.00	24.70	
	300.00	EA	8,031	74	1,410	0	0	9,515	31.72
MIL PL 1"D Plug Valve, Semi-Stl,Scrd			28.22	0.24	29.42	0.00	0.00	57.88	
Lubricated,Wrench Oper w/Wren	300.00	EA	10,869	91	11,333	0	0	22,293	74.31
ch									
MIL PL 2"D Plug Valve, Semi-Stl,Scrd			50.79	0.43	31.31	0.00	0.00	82.53	
Lubricated,Wrench Oper w/Wren	20.00	EA	1,304	11	804	0	0	2,119	105.97
ch									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 1"Thrd St Press Regul & Red,I			59.06	0.53	356.42	0.00	0.00	416.00	
B	300.00	EA	22,748	203	137,290	0	0	160,241	534.14
Sgl Seat,Sprg Load Dir Act Diap									
MIL PL 1" ID Hose x 1-1/4" MPT			13.74	0.07	0.82	0.00	0.00	14.63	
Serrated Shank Nipple	300.00	EA	5,291	28	317	0	0	5,636	18.79
TOTAL AIR PIPING	1.00	JOB	138,536	1,235	181,181	0	0	320,953	320952.62
TOTAL PIPING	1.00	JOB	2,074,244	34,585	1,523,246	220,000	0	3,852,076	3852075.58
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	2,767,430	79,120	6,640,238	8,612,003	207,114	18,305,905	18305905.08

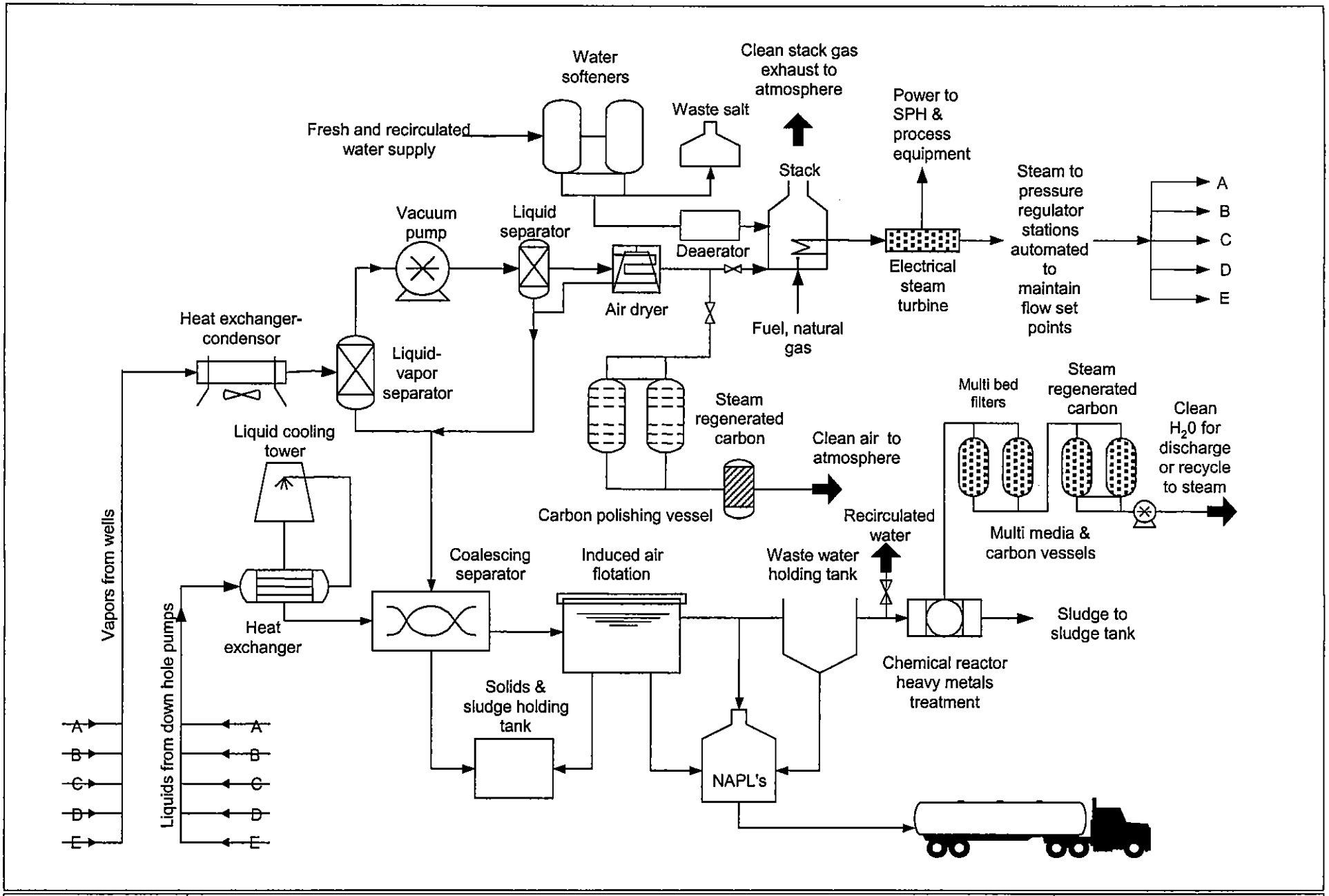


Figure 4-1
Surface Process Diagram

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN
McCormick and Baxter Superfund Site
Stockton, California

Table 3-10
Total Liquid Extraction Rates and Design Capacity of Effluent Treatment System

	Scenario 1	Scenario 2	Scenario 3
Equivalent steam injection rate	186 gpm	274 gpm	386 gpm
Design extraction rate	280 gpm	410 gpm	580 gpm
Miscellaneous process water	40 gpm	55 gpm	70 gpm
Over-extraction need from pump & treat estimate	235 gpm	235 gpm	235 gpm
Total effluent treatment system capacity	475 gpm	575 gpm	700 gpm

Table 4-2
Effluent Treatment System—Components and Sizes

Component	Parameter	Unit	Scenario 1	Scenario 2	Scenario 3	Comment/assumption
Vapor phase liquid separator 1	Air flow rate	scfm air	4,733	7,100	9,467	Non-condensable gas plus 10% of injected steam as condensable vapor
	Liquid flow rate	gpm condensate	22	27	32	Assuming max 5% of liquid extracted with vapor stream
Liquid phase heat exchanger	Liquid flow rate	gpm water	435	535	635	Injected plus 235 gpm
	Cooling capacity	MM BTU/hr	22	27	32	Assumed 100 F cooling
Vapor phase heat exchanger/condensor	Cooling capacity	MM BTU/hr	12	17	22	Assumed 10% of injected energy as steam and energy in 200F condensate
Vapor phase liquid separator 2	Air flow rate	scfm air	1,000	1,500	2,000	
	Liquid flow rate	gpm condensate	23	34	45	Based on maximum vapor phase cooling capacity
Vacuum pumps	Air flow rate	scfm	1,000	1,500	2,000	
	Vacuum	psig	-10	-10	-10	Need to apply vacuum
Vapor treatment units	Air flow rate	scfm	1,000	1,500	2,000	
Water surge tank	Retention time	hours	1	1	1	Need settling and separation time for solids and NAPL
	Minimum capacity	gallons	26,100	32,100	38,100	
Dissolved Air Floatation	Water flow rate	gpm	435	535	635	Recovered fluid and condensate not to exceed maximum pumping rate
	NAPL flow rate	gpm	11	13	16	Assumed max NAPL ratio of 2.5% of total water flow
Multimedia filters	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
Water treatment unit (GAC)	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
NAPL holding tanks	Capacity	gallons	21,000	21,000	21,000	Tanks added and emptied for disposal as needed
	Minimum number	#	2	2	2	Empty backup tank on-site

Table 4-1
Maximum Injection Pressures for Different Depth Zones

	A	B	C	D	E
Depth to top of injection screen (ft)	25	60	125	155	240
Injection pressure (psig)	12.5	30	63	78	107

Table 3-1
Summary of Well Counts by Layer and Scenario

Scenario 1	SES Injection Wells	SES Extraction Wells	SES Dual Purpose Wells	Collocated Injection and Electrical Heating Wells	Collocated Extraction and Electrical Heating Wells	New Perimeter Monitoring Wells	New NAPL Extraction Wells	Deep VEA Hole	Shallow VEA Hole
Completion Zone									
A	53	2	0	0	0	8	5	0	0
B	54	69	0	0	0	10	4	0	13
C	13	14	0	0	0	10	0	0	0
D	3	11	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	25	0
Scenario 2	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VEA Hole**	**Shallow VEA Hole**
Zone of Completion									
A	57	2	0	0	0	8	5	0	0
B	73	74	0	0	9	10	1	0	13
C	22	20	0	0	0	7	0	0	0
D	3	14	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	27	0
Scenario 3	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VEA Hole**	**Shallow VEA Hole**
Zone of Completion									
A	69	2	0	0	0	8	0	0	0
B	85	97	0	0	9	10	0	0	13
C	28	22	0	0	0	8	0	0	0
D	23	16	0	32	13	5	0	0	0
E	12	6	2	0	0	6	0	27	0

"Steve Carroll" <carroll@steamtech.com>

07/02/01 09:22 AM

To: Harry_Ehlers@URSCorp.com
cc:
Subject: RE: angled drilling at McCormick and Baxter site

Good Morning Harry,

further to our telephone conversation of Friday afternoon, I have made some enquiries and found that San Francisco - Sacramento area environmental drilling contractors typically had doubts about drilling to depths of 300 feet at the angles of interest. On the face of it, this might require some changes to the design, possibly with additional, deeper, drilling from a barge in the slough.

I am assured by Patrick Langan (775-246-0296) of Boart Longyear in Dayton, NV, that they would anticipate no difficulty in drilling to these depths at angles as low as 45 degrees using rotary or sonic rigs with down-hole casing advance and that 4 or 6-inch casing and screen could be installed. You may wish to talk to him.

Let me know if I can be of any assistance.

Steve Carroll

(661) 322 6552 Fax
(908) 653-1313 Fax

June 12, 2001

John E. Spear
URS Corporation
12 Commerce Drive
Cranford, NJ 07016-1101

Tim Cechini
Lane Christiansen
Fontana, CA

Re: McCormick and Baxter Superfund Site
Stockton, CA
Drilling Pricing

Dear Tim:

As we discussed in early May we need budget pricing for the drilling and installation of wells at the referenced site. We are working on an Engineers estimate for the Feasibility of this option under contract with the USACOE.

The pricing could be broken down in the following unit prices:

		Unit Price
1. Drilling wells, 12" dia. (288 Wells) These are extraction and injection wells with 6" casing/screens all Stainless Steel. Note that 15 of these wells will be drilled off barge in the Old Mormon Slough. Also 15 of these wells will be drilled at an angle from the bank under the Slough.	36,851 LFT	135 00/ft
2. Install URS furnished Electrodes These electrodes will go in the bottom of some of the 288 wells drilled above.	44 EA	450 00/each
3. Install URS furnished Extraction Pumps	124 EA	725 00/each
4. Install URS furnished Thermocouples ave 40 00/lft → These thermocouples (VEA's) will be installed in 4" dia holes and grouted solid. Total drilling for these 38 will be 8,560 vertical feet.	38 EA	9000 00/each
5. 12" Protective Case and Well head up to flange	288 EA	250/well
6. Install URS furnished Down Hole Instruments	288 EA	450 00/each
7. Well Development 288 Extraction and Injection wells. Monitoring wells below.	288 EA	1000 00/each
8. Pump tests	4 EA	6,300 00/well

Extraction Well
pumps 725 00
Level 450
Temp 450
1625

9. Monitoring wells (39 each with 4" SS Piping/Screens) 5,580 LFT 100/Ft
Complete including drilling, developing, piping, locking caps,

All wells above would include packing, grout etc required in ea. Well.

If you have any questions please call me in my NJ office at 908-653-3154 or 908-653-1300. My fax number in NJ is 908-653-1313.

Cordially,

John E. Spear

[redacted]

BPeake@qedenv.com

06/21/2001 10:49 AM
AST

To:john_spear@urscorp.com
cc:MParker@qedenv.com, telecorder@aol.com
bcc:
Subject:Budget Pricing

Jack

You are working on a very interesting project. Hopefully your proposal proves to be

QED provided a large dedicated groundwater sampling system at the McCormick Baxter s

Please let us know how things progress and if you need any additional information.

Thank you

Brad Peake
Regional Sales Manager
Severn Trent/ QED Environmental Systems
800-624-2026
bpeake@qedenv.com

(See attached file: McCormickBaxterSteam.xls)

McCormickBaxterSteam.xls	**Type:** application/msexcel **Name:** McCormickBaxterSteam.xls

Item	Description	Quantity	Unit Price	Extended Price	
1	HammerHead Pump, bottom load, high temp, Stainless	163	2500	$ 407,500.00	
2	HammerHead Pump, top load, high temp, Stainless	20	2700	$ 54,000.00	
3	Air Compressor, Rotary Screw, NEMA 4, 600 scfm, 125 HP	1	40000	$ 40,000.00	
4	Flexible discharge tubing, pump to piping manifold	14000	11	$ 154,000.00	
5	Air supply tubing, pump to wellhead, stainless steel	14000	6	$ 84,000.00	
6	Pulse Counter with output 4-20 ma signal	163	395	$ 64,385.00	
7	Liquid level measurement, portable magnahelic	1	1000	$ 1,000.00	
7a	Downwell liquid level bubbler tube	14000	2	$ 28,000.00	
8	Spare parts for 163 HammerHead pumps (7 years)	7	6000	$ 42,000.00	
				$ 874,885.00	
	Prices are budgetary and not intended to be final. Pricing				
	does not include freight or any applicable sales or use tax.				

HammerHead™

H4 Series (wells 4" & up)

INSTALLATION & OPERATION MANUAL

Models H45SSB, H45SEB, HF45SSB, HF45SEB, H45SET, HF45SET and HF43SET

HAMMERHEAD™ CLEANUP PUMPS

QED GroundWater Specialists®

P.O. Box 3726 Ann Arbor, MI 48106 USA

Part No. 95067
REV.#2 1-2-95

HAMMERHEAD™ CLEANUP PUMPS

HammerHead™ H4 Series pumps (patent pending) are high-rate, air-driven pneumatic pumps primarily useful for total fluids applications. They run automatically, with the Hammer Drive magnetic relay and internal float system. The system senses liquid level in the pump, turning the air supply on when the pump is full, and turning it off as soon as the pump empties.

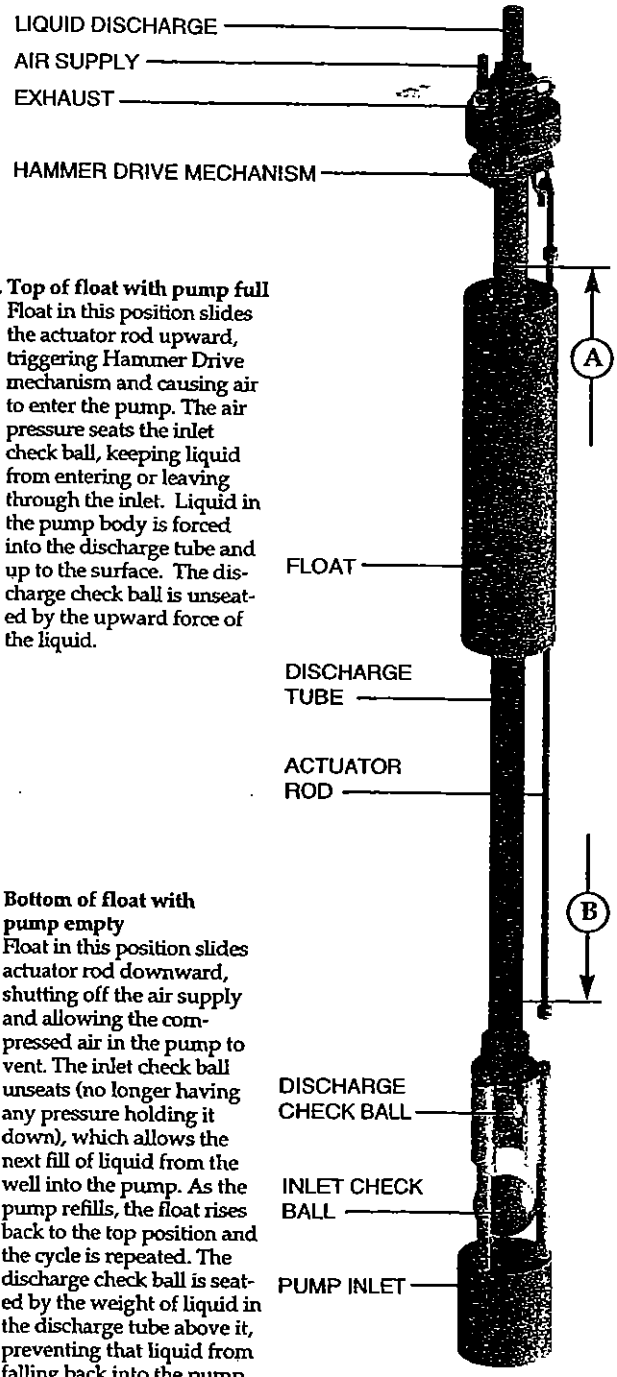
With built-in control, a HammerHead pump doesn't require air cycle timers or on-off level controls at the wellhead, simplifying system design. System setup is easy—just run air to each well. Continued operation is truly hands-off. The pump constantly reacts to changes in well yield, so it always pumps at the highest rate possible, and shuts down automatically when the well drops below pumping level. (NOTE: H4 Series pumps require a minimum of 3.5 feet of liquid above the bottom of the inlet in order to run.)

Because cycling is controlled downwell, a HammerHead pump is either refilling or discharging 100% of the time. There's no waiting between active phases of the cycle for the entire length of air supply tubing to re-pressurize. This operating efficiency enables H4 Series pumps to deliver maximum flow rates of more than 11 gallons per minute while also saving on air supply requirements. It also keeps air out of the liquid discharge system, preventing over-pumping, foaming, and emulsification.

The HammerHead pumping mechanism uses the same high-clearance design and stay-clean ball check valves that set the PULSE PUMP® standard for field performance without clogging or breakdowns. All parts, including the Hammer Drive system, are easily field serviceable.

HOW THE HAMMERHEAD PUMP WORKS

- An H4 Series pump requires a minimum depth of 42" of liquid (measured from the bottom of the pump) to begin pumping.
- The pump automatically shuts off when the liquid level is pumped down below this level, and will automatically begin pumping again once well level has recovered.



A. Top of float with pump full
Float in this position slides the actuator rod upward, triggering Hammer Drive mechanism and causing air to enter the pump. The air pressure seats the inlet check ball, keeping liquid from entering or leaving through the inlet. Liquid in the pump body is forced into the discharge tube and up to the surface. The discharge check ball is unseated by the upward force of the liquid.

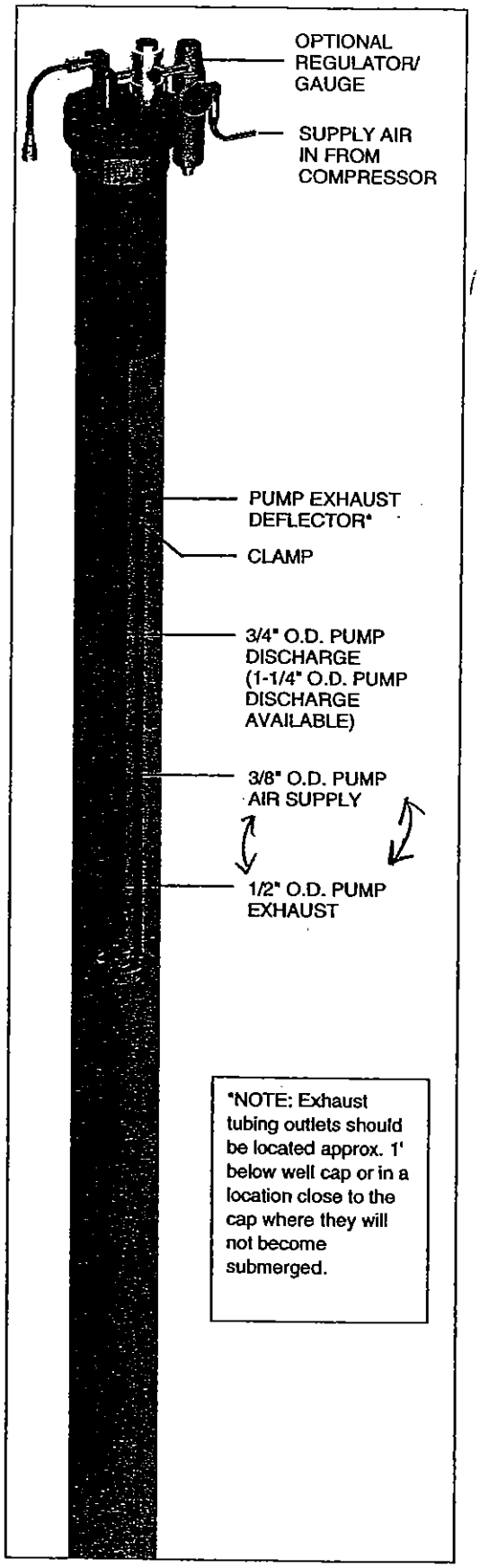
B. Bottom of float with pump empty
Float in this position slides actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (no longer having any pressure holding it down), which allows the next fill of liquid from the well into the pump. As the pump refills, the float rises back to the top position and the cycle is repeated. The discharge check ball is seated by the weight of liquid in the discharge tube above it, preventing that liquid from falling back into the pump body.

H4 SERIES SPECIFICATIONS

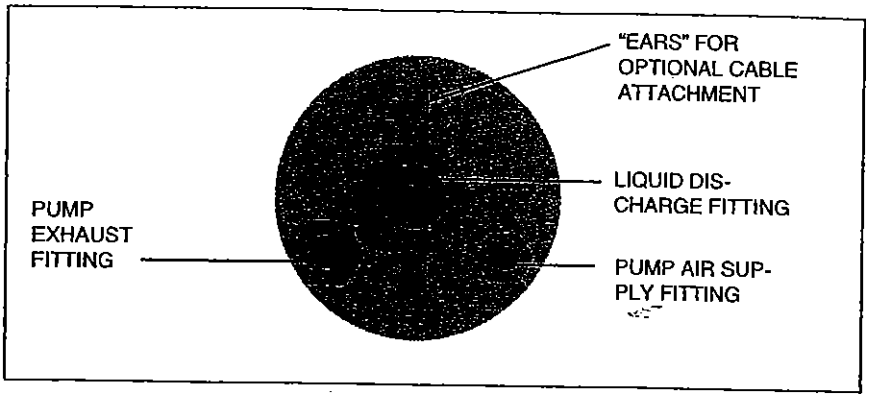
	H4 Series Bottom Inlet	H4 Series Top Inlet	Short H4, Top Inlet
Model No.	H45SSB, H45SEB, HF45SSB, HF45SEB	H45SET, HF45SET	HF43SET
Pump Type	Positive Air Displacement	Positive Air Displacement	Positive Air Displacement
Inlet	Bottom	Top	Top
O.D.	3.5" (89 mm)	3.5" (89 mm)	3.5" (89 mm)
Length	55" (140 cm)	60" (152 cm)	42" (105 cm)
Weight	23.5 lbs. (10.7 kg)	24.0 lbs. (10.9 kg)	16.0 lbs. (7.3 kg)
Materials	Stainless steel construction, with Teflon® inlet and discharge check balls, stainless steel or epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings,
Fittings: Type*	Barb	Barb	Barb
Sizes: Liquid Discharge	3/4" (19 mm) O.D. (H45SSB, H45SEB) or 1-1/4" (32 mm) O.D. (HF45SSB, HF45SEB)	3/4" (19 mm) O.D. (H45SET) or 1-1/4" (32 mm) O.D. (HF45SET)	1 1/4" (32 mm) O.D. Tube
Air Supply	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing
Exhaust	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing
Pump Stroke	0.8 gal. (2850 ml.)	0.8 gal. (2850 ml.)	0.32 gal. (1200 ml.)
Operating pressure range	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)	10-100 psi (70- 695 kPa)
Maximum lift	300 ft. (90 m)	300 ft. (90 m)	200 ft. (60 m)
Maximum flow rate	14+ GPM (54+ LPM) HF45SSB, HF45SEB	11+ GPM (41+ LPM) HF45SET	10 GPM (38 LPM)
Minimum submergence	42" (107 cm) above pump bottom	Top Inlet Port— 58" (147 cm) above bottom of pump	Top Inlet Port— 38" (97 cm) above bottom of pump
Density of pumped liquid	1.0 g/cc (stainless float); 0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)
Cap sizes**	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)

* Note: Pumps are available with tubing or hose; quick disconnect fittings are available on request.

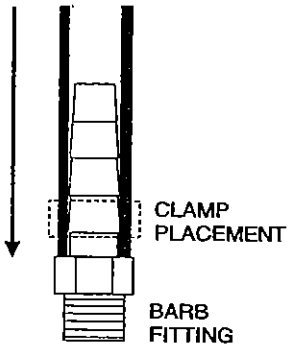
** Special caps available.



*NOTE: Exhaust tubing outlets should be located approx. 1' below well cap or in a location close to the cap where they will not become submerged.



STEP 1. Attach Tubing to Pump



A. Cut back sheathing on tubing set approximately 1 foot.

B. Slip clamps over appropriate tubes prior to connecting to barbs.

C. Push tubing down flush with the fitting's nut if possible; cover at least 3 barbs if 3 or more are present. (Note: in freezing weather, this is easier if tubing is dipped in warm water for a few seconds to soften the nylon.)

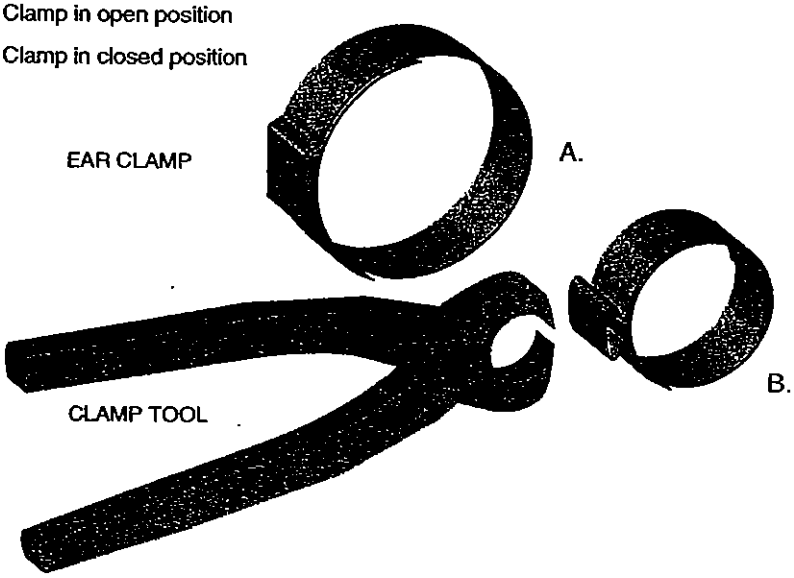
D. Place clamp over lowest barb completely covered by tubing.

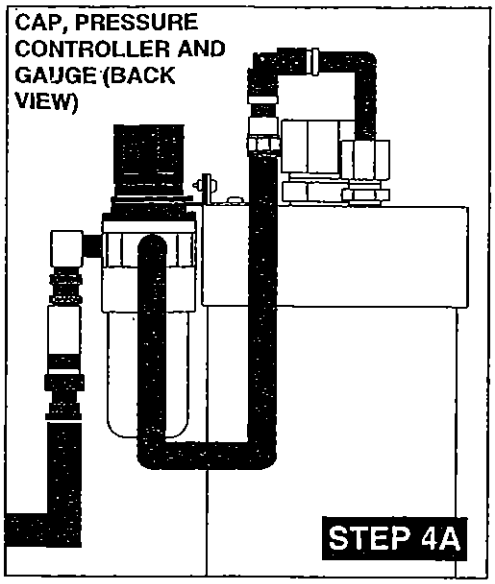
STEP 2. Tighten Clamps

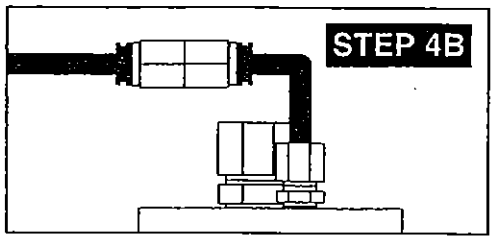
A. Place clamp tool over the dimpled ear portion of the clamp and squeeze ear together (as shown).

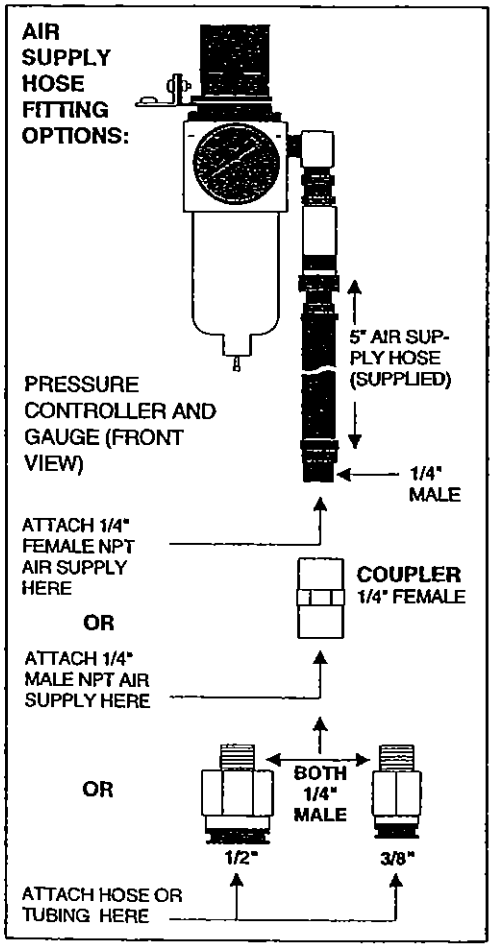
A. Clamp in open position

B. Clamp in closed position









STEP 3. Install Pump in Well

A. Lower pump to desired depth.

B. Once pump depth has been determined, measure off approximately 1 ft. of tubing length (measured from the top of well casing) from the pump exhaust line.

C. Cut exhaust line.

D. Attach the pump exhaust deflector to the pump exhaust line. (See clamp instructions in step 2.)

E. Pass pump discharge and air supply lines through the well cap: place well cap on casing.

F. Re-adjust pump to desired depth.

G. Cut air supply and discharge tubes to desired length.

H. Tighten fittings down onto air/discharge lines, and tighten well cap clamp if present.

STEP 4. Connect Air Supply and Discharge

A. If optional pressure regulator is used, connect short (≈1 foot) hose from regulator to pump air supply line with attached push-on elbow; attach 5' flexible hose to quick-connect fitting on regulator and to air supply line from compressor. See illustration at lower left for air supply hose fitting options.

OR

B. If optional pressure regulator is not used, connect air supply line from compressor directly to pump air supply line above well cap (fittings and coupler for 3/8" and/or 1/2" connections).

C. Connect pump discharge tube to discharge header. (Barb and clamps supplied with pump.)

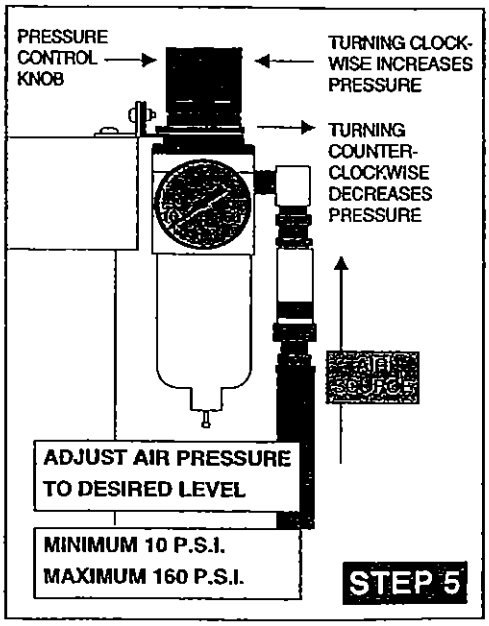
STEP 5. Set Air Pressure

NOTE: Flow Rate is dependent on the amount of air pressure that is received by the pump. Flow rates can be increased by increasing air pressure to the pump or decreased by decreasing air pressure to the pump. For satisfactory performance, pressure should be set at or above 1 psi for every 2 feet of total discharge head—i.e., a pump with T.D.H. of 200' would require 100 psi or more to pump effectively.

A. Adjust air pressure to desired level at compressor—minimum 10 psi, maximum 160 psi.

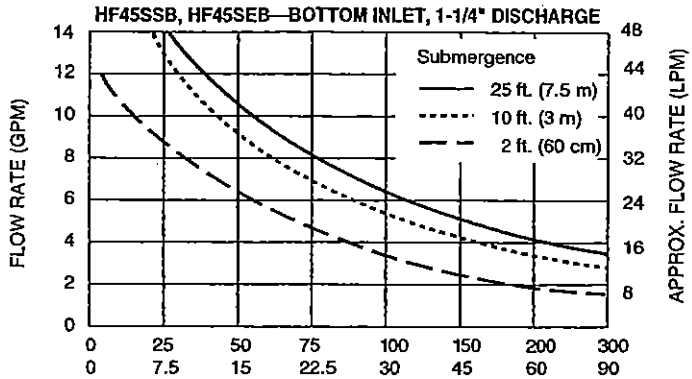
OR

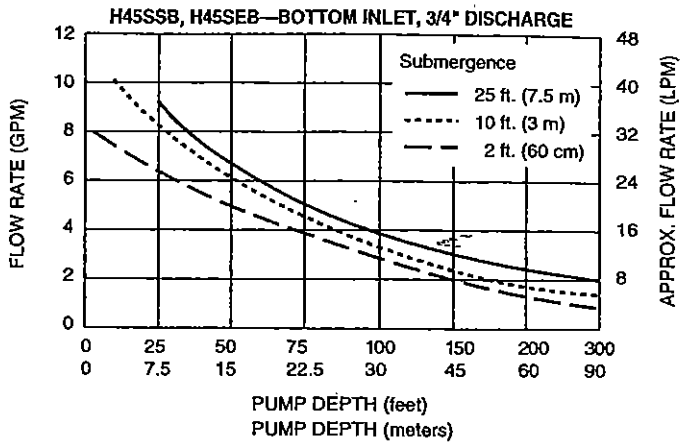
B. Adjust air pressure with optional pressure regulator (see illustration).

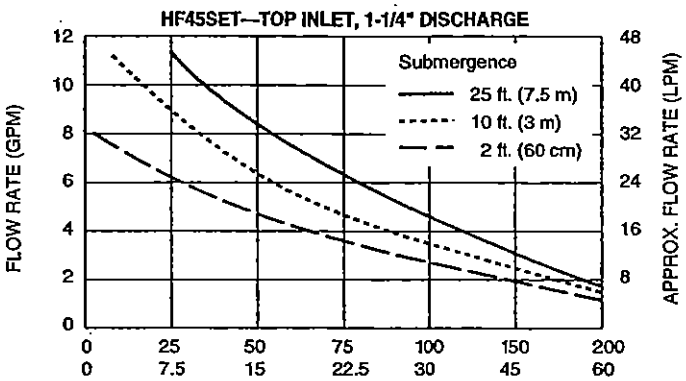


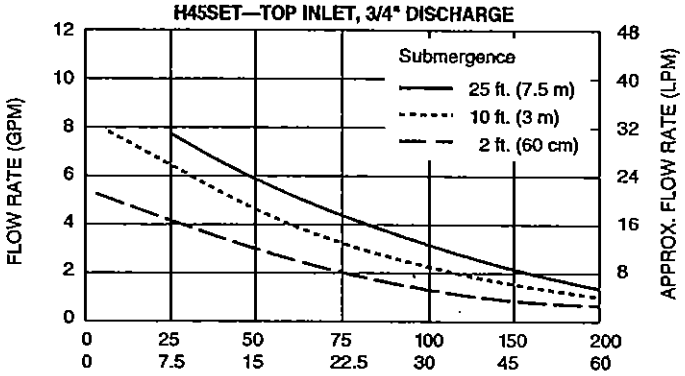
H4 SERIES FLOW PERFORMANCE CURVES

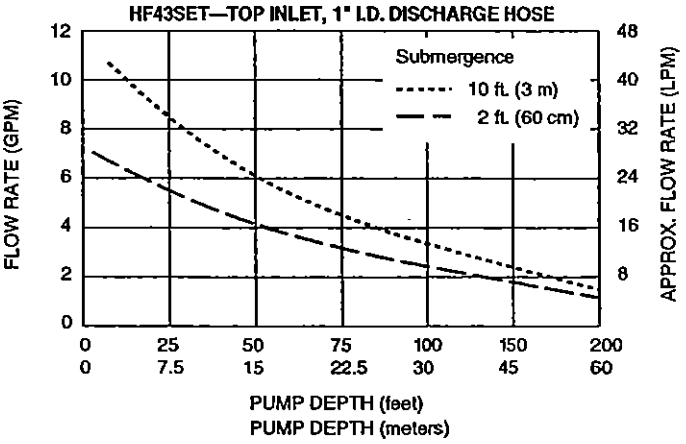
*100 psi (700 kPa) drive air pressure was supplied for all pump depths less than 150 feet (45 meters); 160 psi was supplied for all pump depths greater than 150 feet.











NOTE: Pump depth is measured down from the top of the well casing to the top of the pump fittings. Submergence is measured up from the lowest inlet point on the pump inlet to the top of the static water or product in the well.

ID	A	Max Pump rate
1 1/4"	= 1.6	12
3/4"	= 0.5	8.
1/2"	= 0.25	~4 ?

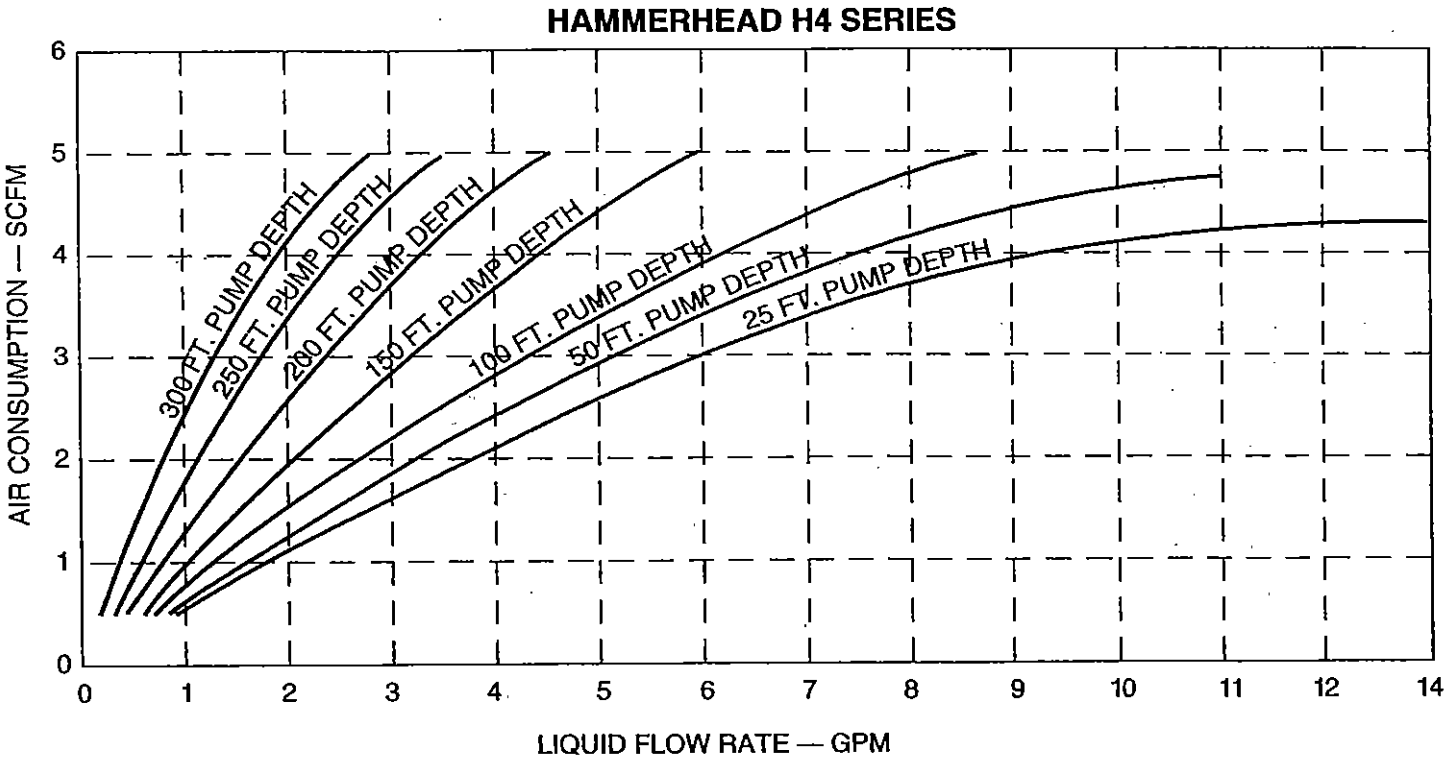
ACCESSORIES

MODEL	PUMP MODEL	DESCRIPTION
37000	All Models	Pump Cycle Counter (for Flow Totalization)
L374	All Models	Tank Full Shutoff
37050	All Models	Kit - Regulator/Gauge
KIH4ST	All Bot. Inlet mod.	Kit - Top Inlet Conversion - H4
KIH4SB	All Top Inlet mod.	Kit - Bottom Inlet Conversion - H4
CH52	All Bot. Inlet mod.	Can - 2' (60 cm) Length (Leachate)
95067	All Models	HammerHead O&M Manual
SPTOOLS	All Models	Clamp Tool, Tube Cutter

MODEL	PUMP MODEL	DESCRIPTION
37058	All Models	Kit - Cable Attachment
37060	All Models	Cable - 3/16" (5 mm) S.S. - order by ft.
37207	All Models	Rope - 3/8" (9 mm) Polypro. - order by ft.
37212	All Models	Cable Sling Assembly
37216	HF4 Series	* Hose - 1" (25 mm) I.D. Discharge (Black)
37217	HF4 Series	* Hose - 3/8" (9 mm) I.D. Air Supply (Red)
37218	HF4 Series	* Hose - 3/8" (9 mm) I.D. Exhaust (Gray)
37208	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Pump
37209	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Well Top
36824	All Models	Flow Throttle Valve

* Hose to be sold with quick connects only

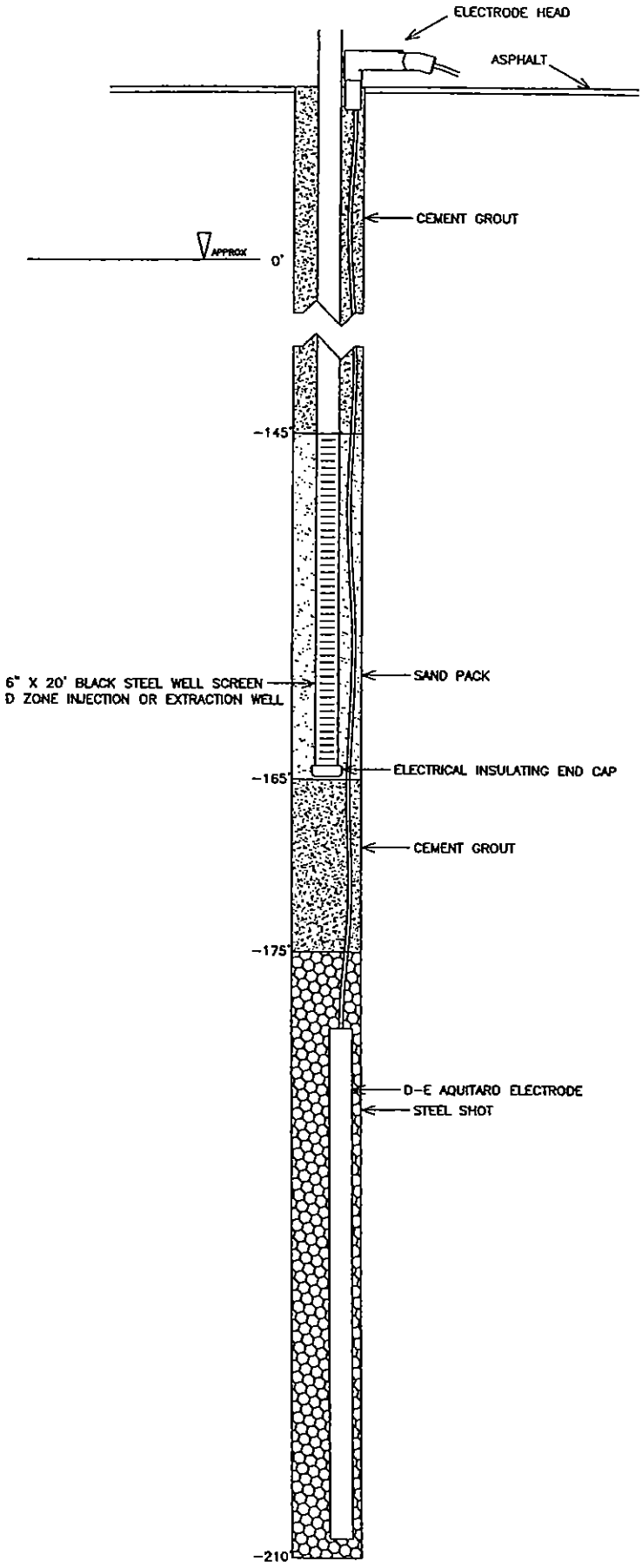
AIR CONSUMPTION



IMPORTANT — AIR FLOW IS ACTUAL. A MAXIMUM "ON-TIME" DUTY CYCLE FOR THE COMPRESSOR MUST BE CONSIDERED IN SELECTING A COMPRESSOR CAPACITY.

MINIMUM AIR FLOW REQUIRED 0.5 SCFM @ 10 PSI
MAXIMUM AIR PRESSURE 160 PSI

HANDOUT #4


ELECTRODE HEAD
ASPHALT
CEMENT GROUT
APPROX
0'
-145'
6" X 20' BLACK STEEL WELL SCREEN
D ZONE INJECTION OR EXTRACTION WELL
SAND PACK
-165'
ELECTRICAL INSULATING END CAP
CEMENT GROUT
-175'
D-E AQUITARD ELECTRODE
STEEL SHOT
-210'

6/20/01

To: Brad Peake QED

From: Jack Spear URS c/o Steamtech (Bakersfield)

12 Commerce Dr.
Cranford, NJ 07016
email: john_spear@urscorp.com

Please quote "budget" pricing for pumps & misc. on next page.

Call if you need.

Bakersfield till 6/21/01 661-322-6478
Cranford after 24th : 908-653-3154

Jack

Brad Peake 800-624-2026

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
1	H4 Hammerhead Pump (bottom loading)	163 EA		
2	H4 Hammerhead Pump (top loading)	20 EA		
4	Air Compressor 600 scfm w/dryer	1 EA		
5	Flexible Tubing (Connection well head to Piping Manifold)	183 EA		
6	Air Tubing (pump to well head) Stainless Steel	14000 LFT		
7	Pulse Counter w/output 4-20 ma signal	163 EA		
8	Pressure transducer w/bubbler probe (ss probe & 1/4" tube) (include line to vacuum to record dif. Press.)	163 EA		
9	Spare parts for 7 years operation	1 ls		

Note: Temperatures in well to 200 deg. F

Bryan Root in Ann Arbor 6/20/01

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
	1 H4 Hammerhead Pump (bottom loading)	163 EA		
	2 H4 Hammerhead Pump (top loading)	20 EA		
	3 Control Panel for up to 205 pumps not needed	1 EA		
	4 Air Compressor 600 cfm needed	1 EA		
	5 Flexible Tubing (Connection well head to ~~Header~~ Manifold at surface)	183 EA		
SS	6 Air Tubing (pump to well head) ~~standard good for 180°F~~	LFT		
	7 Pulse Counter w/output 4-20 ma signal travel up to 1/4 mile to PLC	1 EA		

8. Level Controller — would use if want to maintain pull pump to level. do have surface pressure transducer with bubbler probe.

9. No electrical wiring at all

down well SS probe
1/4" SS tube to bubbler probe
line to vac
line to compressor to bubbler
reads dif back press

Local Rep will call
David Counter QED - San Diego - 760-247-6305 hm.&c.

Send to Ann Arbor Fx# 734-995-1170

Attn Brad ~~Peek~~ Peake (Reg Sales Manager)

Dave Corder # telecorder@aol.com
send email

Table 3-8
Summary of Steam, Power, and Water Demand

	Scenario 1	Scenario 2	Scenario 3
Steam demand during 360 day heat-up	93,000 lbs/hr (100 MM BTU/hr gas)	137,000 lbs/hr (150 MM BTU/hr gas)	193,000 lbs/hr (200 MM BTU/hr gas)
Steam demand during years 2-4	75,000 lbs/hr	101,000 lbs/hr	147,000 lbs/hr
Power demand for electrical heating during year 1 and 2	5,100 kW max 2,550 kW avg	7,400 kW max 3,680 kW avg	7,400 kW max 3,680 kW avg
Maximum water supply for steam generation	205 gpm	310 gpm	440 gpm

Table 3-9
Electrical Heating Design Parameters and Power Demand

	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	13
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	35 tons
Estimated Distance Between Electrodes:	60 ft	60 ft
Total Depth of Electrodes:	220 ft bgs	108 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	52 ft MLLW
Electrode Steel Shot Required:	119 tons	54 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control Units:	5,100 kW	2,300 kW
Average Electrical Heating Power Input:	2,550 kW	1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr

Harry Ehlers
06/14/01 09:10 AM

To: John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: Costs for ERH

Jack, I received this from Greg Beyke today.

Harry Ehlers, Project Engineer
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
Harry_Ehlers@urscorp.com
206/438-2700 (office)
206/438-2699 (fax)

—— Forwarded by Harry Ehlers/Seattle/URSCorp on 06/14/01 09:12 AM ——

Greg Beyke <gbeyke@bellsouth.net>
06/14/01 09:12 AM

To: Harry Ehlers <harry_ehlers@urscorp.com>
cc:
Subject: Costs for ERH

Harry,

Please forward this to Jack. He called me on the road Tuesday. This is the first chance I have had to get back to my office and to the Stockton figures. Please pay particular attention to the items in red font - they are either unnecessary (due to being included in some other portion of the cost estimate), or you might have better cost numbers than I.

Call me with the inevitable questions.

Greg

ERH Cost and Summary 6-14.

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only.					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		8,970	$8.00	$71,760	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		237,100	$0.16	$37,936	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$16,671	
Hydrating Solution (lbs/electrode, electro	140	46	$0.40	$2,576	
Metal Electrodes (shipping, electrodes, co	$660	46	$125	$6,428	
Electrode Liquid Conduit		8,970	$1.10	$9,867	
Electrode Heads		46	$25	$1,150	
Subtotal Electrode Materials					$146,400
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	46	40	$75	$138,000	
Forklift to offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		80	$106	$8,480	
TRS Travel, Per Diem, and Car	$2,400	10	$106	$3,460	
Drill Cutting Waste Disposal (tons,$/ton)		50	$250	$12,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		14	$133	$1,862	
Subtotal Other Electrode Installation Costs					$165,200
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		60	$106	$6,360	
PCS Preliminary Design and Specifications		60	$143	$8,580	
PCS Cost (kW,$/kW)		5,100	$115	$586,500	
PCS Shipping (mi,$/mi)		2800	$3.50	$9,800	
Miscellaneous Shipping	$1,000			$1,000	
Crane to Offload PCS	$2,000			$2,000	
Mobilization Labor		24	$101	$2,424	
PCS Pad and Building (sq.ft., $/sq.ft.)		700	$13.25	$9,275	
TRS Senior Project Manager		6	$133	$798	
Subtotal Power Control System (PCS) Purchase and Mobilization					$626,700
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$3,450	16560	$2.25	$40,710	
Cable Shipping		1500	$1.75	$2,625	
Electrode Wetting System Materials	$4,480			$4,480	
Grounding System Materials ($, feet, $/ft)	$2,760	3,680	$1.10	$6,808	
Subtotal ERH System Construction Materials and Shipping					$54,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		115	$101	$11,615	
PCS Testing		80	$106	$8,480	
Electrode Wetting System Labor		46	$80	$3,680	
Telephone Installation				$500	
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$16,000			$16,000	
TRS Travel, Per Diem, and Car	$3,200	40	$106	$7,440	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		6	$143	$858	

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$93,900
Start-up Labor					
Electrical Specialist		172	$101	$17,372	
Staff Professional		172	$106	$18,232	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		20	$143	$2,860	
Professional Travel and Per Diem	$4,400	50	$106	$9,700	
Subtotal Start-up Labor					$54,300
ERH System Operations and Reporting (per week)					
Electrical Specialist		40	$101	$4,040	
Staff Professional		15	$106	$1,590	
Repair/Consumable Materials	$300			$300	
TRS Senior Project Manager		7	$133	$931	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$300	3.0	$101	$603	
ERH Operations (per week)				$7,890	
Total ERH Operations Cost (weeks, $/week)		100	$7,890		$786,600
Electrical Usage		#########	$0.053		$2,347,700
Demobilization and Salvage					
Planning		80	$133	$10,640	
Forklift/Crane	$2,000			$2,000	
Trash Disposal	$500	3	$80	$740	
Electrical Specialist		160	$101	$16,160	
Staff Professional		40	$106	$4,240	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$900	10	$101	$1,910	
PCS Salvage Value		$586,500	-15%	-$87,975	
Cable Salvage Value		$37,260	-30%	-$11,178	
Subtotal Demobilization and Salvage					-$61,700
Final Reporting					
Electrical Specialist		40	$101	$4,040	
Staff Professional		120	$106	$12,720	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		40	$143	$5,720	
Travel, Per Diem, and Car	$2,400	20	$101	$4,420	
Subtotal Final Reporting					$29,600

Total ERH Cost ########

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only. Well pumps and casing are not included - assumed to be part of Scenario 1 (base case)					
1) Electrode Installation					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		2,070	$8.00	$16,560	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		66,300	$0.16	$10,608	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$5,226	
Hydrating Solution (lbs/electrode, electro	200	9	$0.40	$720	
Metal Electrodes (shipping, electrodes, co	$380	18	$181	$3,632	
Electrode Liquid Conduit		1,350	$1.10	$1,485	
Electrode Heads		9	$25	$225	
Subtotal Electrode Materials					$38,500
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	9	25	$75	$16,875	
Barge for Drilling	included in Scenario 1				
Drilling Overcasing	included in Scenario 1				
Cable and Hose Floats	included in Scenario 1				
Forklift to Offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		40	$106	$4,240	
TRS Travel, Per Diem, and Car	$1,600	10	$106	$2,660	
Drill Cutting Waste Disposal (tons,$/ton)		6	$250	$1,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		8	$133	$1,064	
Subtotal Other Electrode Installation Costs					$27,300
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		20	$106	$2,120	
PCS Preliminary Design and Specifications		20	$143	$2,860	
PCS Cost (kW,$/kW)		2,300	$115	$264,500	
PCS Shipping (mi,$/mi)		2800	$1.75	$4,900	
Miscellaneous Shipping	$500			$500	
Crane to Offload PCS	$500			$500	
Mobilization Labor		4	$101	$404	
PCS Pad and Building (add. sq.ft., $/sq.ft.)		200	$13.25	$2,650	
TRS Senior Project Manager		3	$133	$399	
Subtotal Power Control System (PCS) Purchase and Mobilization					$278,800
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$675	3996	$2.25	$9,666	
Cable Shipping		1500	$0.25	$375	
Electrode Wetting System Materials	$1,520			$1,520	
Grounding System Materials ($, feet, $/ft)	$0	0	$1.10	$0	
Subtotal ERH System Construction Materials and Shipping					$11,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		23	$101	$2,323	
PCS Testing		20	$106	$2,120	
Electrode Wetting System Labor		9	$80	$720	
Telephone Installation				$500	

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$4,000			$4,000	
TRS Travel, Per Diem, and Car	$1,600	20	$106	$3,720	
TRS Senior Project Manager		12	$133	$1,596	
Supervising Professional		2	$143	$286	
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$55,300
Start-up Labor					
Electrical Specialist		86	$101	$8,686	
Staff Professional		86	$106	$9,116	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		10	$143	$1,430	
Professional Travel and Per Diem	$1,800	20	$106	$3,920	
Subtotal Start-up Labor					$26,100
ERH System Operations and Reporting (per week)					
Electrical Specialist		0	$101	$0	
Staff Professional		8	$106	$848	
Repair/Consumable Materials	$150			$150	
TRS Senior Project Manager		4	$133	$532	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$200	2.0	$101	$402	
ERH Operations (per week)				$2,220	
Total ERH Operations Cost (weeks, $/week)		100	$2,220		$221,300
Electrical Usage		#########	$0.053		$1,037,700
Demobilization and Salvage					
Planning		20	$133	$2,660	
Forklift/Crane	$0			$0	
Trash Disposal	$100	1	$80	$180	
Electrical Specialist		40	$101	$4,040	
Staff Professional		20	$106	$2,120	
TRS Senior Project Manager		5	$133	$665	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$800	10	$101	$1,810	
PCS Salvage Value		$264,500	-15%	-$39,675	
Cable Salvage Value		$8,991	-30%	-$2,697	
Subtotal Demobilization and Salvage					-$30,600
Final Reporting					
Electrical Specialist		20	$101	$2,020	
Staff Professional		60	$106	$6,360	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		20	$143	$2,860	
Travel, Per Diem, and Car	$1,200	10	$101	$2,210	
Subtotal Final Reporting					$14,800

Total ERH Cost ########

Table 1 - Remediation Parameters and Cost

Site Name:	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	9
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	6 tons
Estimated Distance Between Electrodes:	60 ft	74 ft
Total Depth of Electrodes:	220 ft bgs	105 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	55 ft MLLW
Electrode Steel Shot Required:	119 tons	33 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control System (PCS):	5,100 kW	2,300 kW
Average Electrical Heating Power Input:		1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr
Electrode Materials and Shipping	$146,400	$38,500
Other Electrode Installation Costs	$165,200	$27,300
PCS Purchase and Mobilization	$626,700	$278,800
ERH System Materials and Shipping	$54,600	$11,600
Labor and Other ERH System Construction Costs	$93,900	$55,300
Start-up Labor	$54,300	$26,100
ERH Operations Cost	$786,600	$221,300
Electrical Usage (at $0.053 per kW-hr)	$2,347,700	$1,037,700
Demobilization and Salvage	-$61,700	-$30,600
Final Reporting	$29,600	$14,800
	$4,243,300	**$1,680,800**

"Steam Tech" <heron@steamtech.com>

07/07/01 06:59 PM

To: John_Spear@URSCorp.com, carroll@steamtech.com
cc: "Susan Schima" <schima@steamtech.com>, sowers@steamtech.com, Harry_Ehlers@URSCorp.com
Subject: Re: VEA & DPT questions

>
> "Susan
> Schima" To: John_Spear@URSCorp.com
> <schima@steam cc: heron@steamtech.com,
sowers@steamtech.com
> tech.com> Subject: Re: Questions &
comments on text
>
> 07/06/2001
> 04:14 PM
>
>
>
>
>
>
>
> Dear Jack,
>
> Below are some costing estimates involved with an ERT survey. These are
> ballpark figures, based on current market values for materials and
> equipment rentals. Please do not hesitate to email me for any further
> questions or for more details on the costing breakdown.
>
> You might expect the general costs for fabricating and operating an ERT and
> temperature survey to include the following:
>
> VEA Fabrication with Thermocouples: $150 per 10 ft, assuming one
> electrode
> and two thermocouples per 10 ft, includes labor and materials
>
> Data Collection Hardware: $300 per day
>
> Mob/Demob: $3000
>
> Labor:
> Data Collection: $300 per day
> Processing Data: $160 per day
> Imaging Data: $145 per day
>
> Note the VEA cost estimate is PER 10 FT. This includes the material costs,
> such as Teflon wire, fiberglass rod, stainless steel electrode, etc, and
> labor for one supervisor and one technician. So, for a single VEA at 120 ft
> depth, the cost might be around $1800.
>
> Also, the VEA cost was based on CPT push. You may need to add more for
> drilling.
>
> Please see Table 6.1.1 for proposed schedule of data collection days to
> estimate grand total for that.
>
>
>
> Distributed Temperature Sensing (DTS) might break down as follows:
>
> Fiber Optic Cable: expect $2.50 per ft for the high temperature, durable,
> coated cable
>
> Data Collection Equipment: $70,000.00 to buy, $6,000 per month lease
>

>
>
>
> Sincerely,
> Susan
>
>
>
>
>

MB-replies-Jack-July7.do

Hello Jack,

I will try to answer your questions, since I will be on the road until Thursday morning.

Jacvk: I must be really stupid but I still don't understand this whole system and Table 6.1.1 also confuses me somewhat. Do we have the fiber optic DPT system? It isn't mentioned in Section 6.1 of the text but is in Appendix D. I had thought that the idea was played with but wasn't part of this CD.

Gorm: Don't worry, we know you are a bright fella. Yes we plan to include DTS in the design. Susan, please review the text and make sure that we present this design.

Jack: Regarding the VEA in operation. Will the operators at the site (we currently have two full time 24 hours/day plus a technical person 8 hours per day during thermal and cool down phases in the estimate) be able to provide the labor that Susan mentions to operate and monitor the VEA system or do we need the additional at the rates quoted below for data collection, processing data and imaging data?

Gorm: Please assume that the operators can run the DTS as well.

Jack: What additional system/hardware/software besides our computer system priced for the site operators office do we need to collect and report the data from the VEA array? Susan mentions a pretty expensive data collection system for the DPT which if we need I will add to the estimate but I'm not sure what else. Gorm gave me a table with the linear ft of VEA needed and I have priced installation including grouting of this in the estimate but I have not received anything about the DPT system and how it is installed. If we don't use the fiber optic wire is there some other temperature sensing system that will be installed?

Will a data collection and some kind of power wire be needed for every electrode going back to the operations office? What is the number of electrodes? (Perhaps the number is on a table somewhere and I have forgotten where.) .

Gorm: We need a DTS system (70k). The fiberoptic cable and ERT electrodes with wires should be included in the cost per 10 ft provided by Susan.

Jack: As for Table 6.1.1 what are the "new P&T" extraction wells and monitoring wells? Is this a left over from the time we were planning to P&T for 20 or more years after the cool down or are these the extraction and monitoring wells we still have in the system?

Gorm: They are the NAPL recovery and hydraulic control wells located outside the thermal treatment area, as designed by Mike Bailey.

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25. START UP, TESTING, O&M PLAN								
3300.25. 5. O&M MANUAL								
3300.25. 5.10. PCS Commissioning Manual								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00 EA	4,268	0	0	0	500	4,768	4768.00
3300.25. 5.13. Preliminary Draft - O&M Manual Spec Section 01830								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Site Superintendant		61.99	0.00	0.00	0.00	0.00	61.99	
	8.00 HR	496	0	0	0	0	496	61.99
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	4.00 HR	414	0	0	0	0	414	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preliminary Draft - O&M Manua	1.00 EA	23,239	0	0	0	600	23,839	23839.48
3300.25. 5.18. Revised Draft - O&M Manual								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	60.00 HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	20.00 HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	16.00 HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	4.00 HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	8.00 HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	2.00 HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	8.00 HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00 EA	7,955	0	0	0	600	8,555	8555.20
3300.25. 5.23. Final - O&M Manual								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	8.00 HR	730	0	0	0	0	730	91.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	2.00 HR	169	0	0	0	0	169	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00 HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	1.00 HR	103	0	0	0	0	103	103.40
Health and Safety Manager (CIH)								
USR AA Technician VI - Plant Operato		35.42	0.00	0.00	0.00	0.00	35.42	
r	20.00 HR	708	0	0	0	0	708	35.42
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
TOTAL Final - O&M Manual	1.00 EA	5,280	0	0	0	600	5,880	5880.00
TOTAL O&M MANUAL	1.00 JOB	40,743	0	0	0	2,300	43,043	43042.68
3300.25.10. STARTUP/COMMISSION TREATMENT SYS								
3300.25.10. 5. ENGINEERS & TECHNICIANS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	80.00 HR	8,272	0	0	0	0	8,272	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
-	320.00 HR	23,232	0	0	0	0	23,232	72.60
Startup/Proveout Project Manager								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	240.00 HR	21,912	0	0	0	0	21,912	91.30
P&ID Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	80.00 HR	7,304	0	0	0	0	7,304	91.30
I&E Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	120.00 HR	10,956	0	0	0	0	10,956	91.30
PC/MMI Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00 HR	18,260	0	0	0	0	18,260	91.30
PC/MMI Programmer								

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; Startup Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Senior Engineer/Scientist IV - Director QA/QC		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Senior Engineer/Scientist II Purchaser		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Technician/Analyst IV - Secretary		33.00	0.00	0.00	0.00	0.00	33.00	
	40.00 HR	1,320	0	0	0	0	1,320	33.00
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	80.00 HR	6,776	0	0	0	0	6,776	84.70
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	1120.00 HR	59,506	0	0	0	0	59,506	53.13
USR AA GWTP Plant Operator		43.47	0.00	0.00	0.00	0.00	43.47	
	600.00 HR	26,082	0	0	0	0	26,082	43.47
MIL AA Electricians		35.93	0.00	0.00	0.00	0.00	35.93	
	80.00 HR	2,874	0	0	0	0	2,874	35.93
USR AA Vendor/Manufacturers Reps; Installation and Startup		0.00	0.00	0.00	4000.00	0.00	4000.00	
	8.00 EA	0	0	0	32,000	0	32,000	4000.00
USR AA Site QC/HSO		43.47	0.00	0.00	0.00	0.00	43.47	
	270.00 HR	11,737	0	0	0	0	11,737	43.47
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	172.00 HR	0	0	0	17,372	0	17,372	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	172.00 HR	0	0	0	18,232	0	18,232	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	40.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	20.00 HR	0	0	0	2,860	0	2,860	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	9700.00	0.00	9700.00	
	1.00 LS	0	0	0	9,700	0	9,700	9700.00
TOTAL ENGINEERS & TECHNICIANS	1.00 JOB	220,750	0	0	80,164	0	300,914	300913.96

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.10. TRAVEL & PER DIEM								
USR AA Mileage on Personal Car, Trip		0.00	0.00	0.00	0.00	0.31	0.31	
s	16000 MI	0	0	0	0	4,960	4,960	0.31
for O&M Proj Mgr from office.								
USR AA Apartments for site personnel		0.00	0.00	0.00	0.00	1600.00	1600.00	
Mgr and HSO.	8.00 MO	0	0	0	0	12,800	12,800	1600.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	120.00 DAY	0	0	0	0	5,040	5,040	42.00
USR AA Airfare Trips for Vendor Reps		0.00	0.00	0.00	0.00	500.00	500.00	
and Instrumentation and	10.00 EA	0	0	0	0	5,000	5,000	500.00
Electrical Engineering								
personnel.								
USR AA Rental Car, Total of 4 cars f		0.00	0.00	0.00	0.00	45.00	45.00	
or	80.00 DAY	0	0	0	0	3,600	3,600	45.00
two months.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	20.00 EA	0	0	0	0	400	400	20.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	31,800	31,800	31800.00
3300.25.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot		0.00	0.00	5000.00	0.00	0.00	5000.00	
hes	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	4.00 MO	0	5,200	0	0	800	6,000	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P		0.00	7.52	0.00	0.00	0.00	7.52	
KUP	640.00 HR	0	4,814	0	0	0	4,814	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	10,014	5,000	0	800	15,814	15814.02
3300.25.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine		0.00	0.00	0.00	0.00	35.00	35.00	
	2.00 MO	0	0	0	0	70	70	35.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	3.00 MO	0	0	0	0	225	225	75.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	2.00 MO	0	800	0	0	0	800	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	3000.00	0.00	0.00	3000.00	
	2.00 LS	0	0	6,000	0	0	6,000	3000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 MO	0	0	0	400	0	400	200.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	400.00	0.10	400.10	
	2.00 MO	0	0	0	800	0	800	400.10
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	1,600	6,800	1,200	13,395	22,995	22995.20

3300.25.10.26. OPERATING/PROCESS UTILITIES
Assume 1.5 Megawatt-Hrs per day or 62.5 KW per hour @ $0.053/KW.

USR AA Natural Gas, 100 mmbtu/hour @		0.00	0.00	0.00	0.00	336.00	336.00	
1050 btu/scft @ $3.50/MCFT	100.00 HR	0	0	0	0	33,600	33,600	336.00
USR AA Electircity for Electrodes:		0.00	0.00	0.00	0.00	83.30	83.30	
Assume 20 megawatt/day or 833	100.00 HR	0	0	0	0	8,330	8,330	83.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	6.25	6.25	
ent	100.00 HR	0	0	0	0	625	625	6.25
Plant, Steam:								
USR AA Water @ 250 gpm or 15,000		0.00	0.00	0.00	0.00	16.00	16.00	
gal/hour = 20 units/hour @ $0	100.00 HR	0	0	0	0	1,600	1,600	16.00
.80								
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	0.28	0.28	
198.00/mon	100.00 HR	0	0	0	0	28	28	0.28
TOTAL OPERATING/PROCESS UTILITIES	1.00 JOB	0	0	0	0	44,183	44,183	44183.00
3300.25.10.30. CHEMICALS								
USR AA GAC (Liquid); average useage		0.00	0.00	1.87	0.00	0.00	1.87	
35	1050.00 LB	0	0	1,964	0	0	1,964	1.87
lb/day x 30 days operation								
USR AA GAC (Air); 40 lb/ day x 30 da		0.00	0.00	2.30	0.00	0.00	2.30	
ys	1200.00 LB	0	0	2,760	0	0	2,760	2.30
operation = 1200 lb.								
USR AA Alum		0.00	0.00	2.00	0.00	0.00	2.00	
	1050.00 LB	0	0	2,100	0	0	2,100	2.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10000 LB	0	0	1,500	0	0	1,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Polymer, One 55 gal drum/mo.		0.00	0.00	1.78	0.00	0.00	1.78	
	135.00 LB	0	0	240	0	0	240	1.78
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	1500.00 LB	0	0	60	0	0	60	0.04
TOTAL CHEMICALS	1.00 JOB	0	0	8,624	2,000	0	10,624	10623.80

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filter A		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter B		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter C Cartridges		0.00	0.00	21.20	0.00	0.00	21.20	
	230.00 EA	0	0	4,876	0	0	4,876	21.20
USR AA Filter D		0.00	0.00	6.70	0.00	0.00	6.70	
	24.00 EA	0	0	161	0	0	161	6.70
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	6,109	0	0	6,109	6108.80
3300.25.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	3.00 MO	0	1,350	0	0	0	1,350	450.00
USR AA LEL		0.00	200.00	0.00	0.00	0.00	200.00	
	3.00 MO	0	600	0	0	0	600	200.00
USR AA PPE - Level D Modified		0.00	0.00	2400.00	0.00	0.00	2400.00	
	1.50 MO	0	0	3,600	0	0	3,600	2400.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	1,950	3,600	0	0	5,550	5550.00
3300.25.10.45. DISPOSALS STARTUP								
USR AA Sludge Disposal		0.00	0.00	0.00	420.00	0.00	420.00	
	40.00 DRM	0	0	0	16,800	0	16,800	420.00
USR AA Sludge Waste Characterization - Full TCLP & Waste Char. for Carbon (liquid and vapor) and sludge.		0.00	0.00	0.00	0.00	665.00	665.00	
	2.00 EA	0	0	0	0	1,330	1,330	665.00
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	200.00 GAL	0	0	0	396	0	396	1.98
TOTAL DISPOSALS STARTUP	1.00 JOB	0	0	0	17,196	1,330	18,526	18526.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.50. PERSONNEL TRAINING								
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00 HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	40.00 HR	2,125	0	0	0	0	2,125	53.13
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -		33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00 HR	528	0	0	0	0	528	33.00
USR AA Misc Materials		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00 JOB	8,510	0	500	0	0	9,010	9009.60
3300.25.10.55. SAMPLING/ANALYSIS; STARTUP								
3300.25.10.55.05. DATA VALIDATION								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	27.00 HR	1,604	0	0	0	0	1,604	59.40
TOTAL DATA VALIDATION	1.00 JOB	1,604	0	0	0	0	1,604	1603.80

3300.25.10.55.30. ANALYTICALS PROCESS
Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	13.00 EA	0	0	1,287	0	0	1,287	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	26.00 EA	0	0	131	0	0	131	5.02

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M HTW AA TAL Metals		0.00	0.00	80.00	0.00	0.00	80.00	
	18.00 EA	0	0	1,440	0	0	1,440	80.00
HTW AA TCL VOC (SW-846, 8260B)		0.00	0.00	296.00	0.00	0.00	296.00	
Includes 4 trip blanks.	22.00 EA	0	0	6,512	0	0	6,512	296.00
M HTW AA TPH EPA 418.1		0.00	0.00	120.00	0.00	0.00	120.00	
	18.00 EA	0	0	2,160	0	0	2,160	120.00
HTW AA TCL SVOC (SW-846, 8270C)		0.00	0.00	564.00	0.00	0.00	564.00	
	18.00 EA	0	0	10,152	0	0	10,152	564.00
HTW AA Suspended Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
HTW AA Dissolved Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	280.00	0.00	0.00	280.00	
	18.00 EA	0	0	5,040	0	0	5,040	280.00
TOTAL ANALYTICALS PROCESS	1.00 JOB	0	0	32,124	0	0	32,124	32123.52
3300.25.10.55.40. BOILER AIR EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	5.00 EA	0	0	0	1,375	0	1,375	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
USR AA VOC's		0.00	0.00	0.00	60.00	0.00	60.00	
	5.00 EA	0	0	0	300	0	300	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	5.00 EA	0	0	0	175	0	175	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	5.00 EA	0	0	0	500	0	500	100.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	10.00 EA	0	0	990	0	0	990	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	10.00 EA	0	0	50	0	0	50	5.02
USR AA Tedlar Bags		0.00	0.00	10.00	0.00	0.00	10.00	
	100.00 EA	0	0	1,000	0	0	1,000	10.00
TOTAL BOILER AIR EMISSIONS	1.00 JOB	0	0	2,040	7,500	0	9,540	9540.20
3300.25.10.55.45. VAPOR PH GAC EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	2.00 EA	0	0	0	550	0	550	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	2.00 EA	0	0	0	1,900	0	1,900	950.00
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	2.00 EA	0	0	0	120	0	120	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	2.00 EA	0	0	0	70	0	70	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	2.00 EA	0	0	0	200	0	200	100.00
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA CO		0.00	0.00	0.00	115.00	0.00	115.00	
	2.00 EA	0	0	0	230	0	230	115.00
USR AA SOx		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00
USR AA NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00	EA	0	0	396	0	0	396	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00	EA	0	0	20	0	0	20	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	25.00	EA	0	0	250	0	0	250	10.00
TOTAL VAPOR PH GAC EMISSIONS	1.00	JOB	0	0	666	3,830	0	4,496	4496.08
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00	JOB	1,604	0	34,830	11,330	0	47,764	47763.60
3300.25.10.60. SOURCE TEST									
USR AA Source Test			0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL SOURCE TEST	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL STARTUP/COMMISSION TREATMENT	1.00	JOB	230,863	13,564	65,462	141,890	91,508	543,288	543287.98
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	271,606	13,564	65,462	141,890	93,808	586,331	586330.66

3300.30. DEMOBILIZATION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30. DEMOBILIZATION								
3300.30.21. DEMOBILIZATION								
3300.30.21.01. Removal of Temp Facilities								
USR AA Demobe Contractor Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer		0.00	0.00	0.00	100.00	0.00	100.00	
	1.00 LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit y Post Abatement Clean Up		167.66	19.73	25.00	0.00	0.00	232.39	
	1.00 EA	188	20	25	0	0	232	232.39
USR AA Removel Water Supply		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Remove Furniture in Temp Off ice		0.00	0.00	0.00	250.00	0.00	250.00	
	1.00 LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Remova l; 01770		284.24	87.95	0.00	0.00	0.00	372.20	
	4.00 AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00 JOB	1,325	372	25	1,450	0	3,171	3171.18
3300.30.21.02. Removal of Temp Utilities								
USR AA Remove Temp Electricity		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL Removal of Temp Utilities	1.00 JOB	0	0	0	10,000	0	10,000	10000.00
3300.30.21.04. Demobe of Construction Equipment								
USR AA Demobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00 JOB	0	0	0	0	1,000	1,000	1000.00
TOTAL DEMOBILIZATION	1.00 JOB	1,325	372	25	11,450	1,000	14,171	14171.18

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22. REPORTS, CLOSEOUT									
3300.30.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	4,356	0	0	0	600	4,956	4956.00
3300.30.22.10. Record Drawings									
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	20.00	EA	0	0	0	0	1,000	1,000	50.00
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	400.00	HR	26,840	0	0	0	0	26,840	67.10
USR AA Senior Engineer/Scientist II; Site Superintendant			72.60	0.00	0.00	0.00	0.00	72.60	
	160.00	HR	11,616	0	0	0	0	11,616	72.60
USR AA Construction Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	80.00	HR	7,304	0	0	0	0	7,304	91.30
TOTAL Record Drawings	1.00	JOB	45,760	0	0	0	1,000	46,760	46760.00
3300.30.22.15. Chemical Data Final Report									
USR AA Senior Engineer/Scientist IV - Chem Qual Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	16.00	HR	1,355	0	0	0	0	1,355	84.70
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	80.00	HR	6,776	0	0	0	0	6,776	84.70
TOTAL Chemical Data Final Report	1.00	JOB	8,439	0	0	0	600	9,039	9039.20

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22.20. Remedial Action Report									
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	100.00	HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	400.00	HR	16,720	0	0	0	0	16,720	41.80
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	400.00	HR	33,880	0	0	0	0	33,880	84.70
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	400.00	HR	19,360	0	0	0	0	19,360	48.40
USR AA ODC's			0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00	LS	0	0	0	0	1,000	1,000	1000.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	80.00	HR	3,080	0	0	0	0	3,080	38.50
TOTAL Remedial Action Report	1.00	JOB	83,380	0	0	0	1,000	84,380	84380.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	141,935	0	0	0	3,200	145,135	145135.20
TOTAL DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL CAPITAL COSTS	1.00	JOB	5,786,213	246,336	7,091,195	10019507	649,669	23,792,919	23792919.02

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400. 1ST YEAR O&M								
3400. 5. GENERAL CONDITIONS								
3400. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3400. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3400. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3400.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3400.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3400.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3400.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	40,080	40,000	0	80,080	6673.33

3400.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	1271293	MBT	0	0	0	0	4,449,526	4,449,526	3.50
@ $3.50									
USR AA Electricity for Electrodes			0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	22338	KKW	0	0	0	0	1,340,280	1,340,280	60.00
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	22338	KKW	0	0	0	0	-1340280	-1,340,280	-60.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	8760.00	KKW	0	0	0	0	525,600	525,600	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	140160	UNT	0	0	0	0	112,128	112,128	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	5,094,430	5,094,430	424535.79

Table 4-4
Utility Estimates for Different Phases of Operation for Each Scenario

Fresh water usage estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	200	300	400	gpm	100% fresh water					
Continued thermal treatment	Year 2	133	200	267	gpm	67% fresh water					
Continued thermal treatment	Year 3	100	150	200	gpm	50% fresh water					
Continued thermal treatment	Year 4	100	150	200	gpm	50% fresh water					
Cool-down	Year 5	10	15	20	gpm	100% fresh water					
Cool-down	Year 6	10	15	20	gpm	100% fresh water					
Cool-down	Year 7	10	15	20	gpm	100% fresh water					
Treatment system pumping capacity	Maximum	475	575	700	gpm						
Steam generation water demand	Maximum	200	300	400	gpm						
						General process power			Electrical heating demand		
Power consumption estimates		Scenario 1	Scenario 2	Scenario 3		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Heatup	Year 1	3,550	5,080	5,480	kW	1,000	1,400	1,800	2,550	3,680	3,680
Continued thermal treatment	Year 2	3,551	5,080	5,480	kW	1,000	1,400	1,800	2,551	3,680	3,680
Continued thermal treatment	Year 3	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Continued thermal treatment	Year 4	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Cool-down	Year 5	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 6	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 7	500	650	800	kW	500	650	800	0	0	0
Max power usage for equipment sizing	Maximum	6,600	9,400	9,900	kW	1,500	2,000	2,500	5,100	7,400	7,400
Natural gas consumption estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	152,381	228,571	304,762	scfh	80% firing rate in average					
Continued thermal treatment	Year 2	133,333	200,000	266,667	scfh	70% firing rate					
Continued thermal treatment	Year 3	114,286	171,429	228,571	scfh	60% firing rate					
Continued thermal treatment	Year 4	95,238	142,857	190,476	scfh	50% firing rate					
Cool-down	Year 5	0	0	0	scfh	No steam generation					
Cool-down	Year 6	0	0	0	scfh	No steam generation					
Cool-down	Year 7	0	0	0	scfh	No steam generation					

Table 4-5
Estimation of Consumption of Grid Power During Operation

Total power consumption		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	3550	5080	5480	kW
Continued thermal treatment	Year 2	3551	5080	5480	kW
Continued thermal treatment	Year 3	800	1000	1200	kW
Continued thermal treatment	Year 4	800	1000	1200	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Co-generation power available[1]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	2200	3300	4400	kW
Continued thermal treatment	Year 2	1760	2640	3520	kW
Continued thermal treatment	Year 3	1540	2310	3080	kW
Continued thermal treatment	Year 4	1320	1980	2640	kW
Cool-down	Year 5	0	0	0	kW
Cool-down	Year 6	0	0	0	kW
Cool-down	Year 7	0	0	0	kW
Grid power comsumption[2]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	1350	1780	1080	kW
Continued thermal treatment	Year 2	1791	2440	1960	kW
Continued thermal treatment	Year 3	250	350	500	kW
Continued thermal treatment	Year 4	250	350	500	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Recommended minimum service	project	2000	2500	2500	kW
1) Co-generation power rates reduced with scaled down steam injection rates					
2) A minimum of 50% of the general process power is assumed to be provided by grid power					

URS

THE SEATTLE TIMES LOCAL / REGIONAL THURSDAY, JUNE 14, 2001

Expect a cap on electrical rates outside California

P-I STAFF AND NEWS SERVICES

WASHINGTON — Federal regulators are expected next week to expand price restrictions on electricity to include Washington state, according to government officials.

According to congressional and industry sources, the Federal Energy Regulatory Commission on Monday is likely to broaden the caps, which it announced in April. They now apply only to California, and only when low power reserves cause a supply emergency.

The restrictions impose ceilings on how much power generators can charge utilities on the wholesale market.

It is unclear what the effect would be on energy prices in Washington state, but electrical and natural-gas prices in California declined after the April order. Although FERC Chairman Curtis Hebert attributed the drop to the limited price controls, Senate Democrats say the reason for the lower prices is uncertain.

Western lawmakers said expanding the price caps to other states and to non-emergency transactions would be a step in the right direction but would still fall short of the extended price caps for which Sen. Patty Murray, D-Wash., and others have been calling.

"It's encouraging that they are going to wake up and smell the coffee and recognize they have a legal responsibility to assure prices are just and reasonable," said Murray's spokesman, Todd Webster. "Senator Murray is hopeful that FERC will come out of hibernation and address the price gouging."

Murray has been pressing FERC to set a two-year price cap that would not apply to any plants currently under construction "but would tamp down on some of these crazy prices being charged," Webster said.

This week, electrical prices on the spot market in California fell to below $100 a megawatt-hour for the first time this year. Natural-gas prices eased, too. Earlier this year, prices frequently surpassed $300 a megawatt-hour, 10 times what they were in precrisis 1999. A megawatt is enough electricity to serve about 600 homes.

"Our price mitigation plan is working," Hebert said yesterday. However, California officials say it is too early to make that claim.

At a Senate hearing yesterday, Sen. Dianne Feinstein, D-Calif., said the reason for recent price drops is unclear, but that "it now appears" FERC will broaden its April order.

The five-member commission of three Republicans and two Democrats has come under attack from Democrats in Congress and from California Gov. Gray Davis. Davis has criticized the limited price caps, calling them inadequate and full of loopholes; he has also charged FERC with being far too timid in curtailing price gouging in the wholesale Western power markets.

The commission regulates wholesale electrical markets and interstate natural-gas pipelines. Under a 1934 law, it is required to ensure prices are just and reasonable.

Hebert, a Republican named chairman by President Bush in January, defended the agency at an energy forum yesterday but also acknowledged the recent criticism: "We're not the most popular people in town right now."

Also yesterday, several economists told a Senate hearing that temporary price controls, if structured properly, should not impede electrical investments and supplies as Republican lawmakers and the administration have argued.

"It is incorrect that regulation necessarily interferes with supplies," Cornell economist Alfred Kahn, a prominent deregulation advocate, told the Senate Governmental Affairs Committee.

Kahn said that if price caps were temporary, exempted new power plants, and provided sufficient profits, "there will be no shortage of people interested and willing to build new power plants."

"The greatest danger is continued chaos," said Paul Joskow, an economist at the Massachusetts Institute of Technology. He, too, urged some price controls based on costs of production.

Sen. Fred Thompson, R-Tenn., said the economists were painting "a rosy picture." He read letters from several Wall Street analysts who insisted that price controls would be a "recipe for disaster" and make investors reluctant to enter the California power market.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

SEATTLE POST-INTELLIGENCER | THURSDAY, JUNE 14, 2001

NATION

POWER

CONTINUED FROM B 1

in April apply only to California markets in emergency situations.

Peak demand prices for electricity on the Mid-Columbia wholesale market — where Northwest utilities buy power — slid below $100 a megawatt-hour June 6 for the first time this year. At times this month they have dipped as low as $36.80.

That's a far cry from the $500 per megawatt-hour some expected for this time of year or the up to $750 per megawatt-hour paid in December.

Prices for natural gas are also tumbling, hitting $3.46 per million British thermal units for gas traded at the hub at Sumas, Whatcom County, yesterday, down from an unprecedented high of $14.20 in January.

The drop in price this spring has been precipitous, with prices falling 23.4 percent from last month to this month, according to Kelley Doolan, natural-gas market specialist for Platts, a division of McGraw-Hill.

Experts cited a range of factors for the wholesale-price drops:

• Weather is the biggest single reason, as well as the largest wild card in the West Coast energy picture. Unusually cool, wet weather has prevailed in recent weeks throughout the West, cutting the usual demand for air conditioning.

• Decline in demand as a result of conservation. Power consumption is down 6.5 percent in California for the three months ending in May compared with the similar period a year ago, adjusted for differences in the weather, according to the California Energy Commission.

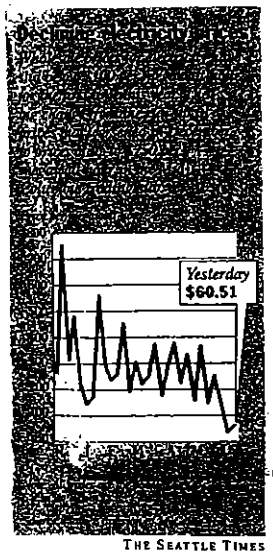
In Washington state, energy experts report a 5 percent reduction in use so far this year. "What we are doing is working," said Ralph Cavanaugh, Northwest energy-program director for the Natural Resources Defense Council an environmental group.

• Decrease in demand by industrial users. Power guzzlers, such as aluminum companies, have unplugged, reducing demand in the grid in the Pacific Northwest.

• Increase in supply. California power plants shut down for spring maintenance in April and May are now back on line for the summer. That put about 15,000 megawatts of generating capacity back on the grid. New power plants have also fired up, including one in Oregon and another in Idaho.

Spring runoff has also added water to Northwest rivers, boosting supply for hydroelectric generation.

Relatively speaking, though,



THE SEATTLE TIMES

wholesale prices for electricity and natural gas are high: gas costs about twice what it did a year and a half ago, and so does electricity. "We are out of the stratosphere, but we haven't landed," said Jim Lazar, an independent energy consultant based in Olympia.

And consumers have yet to see any cut in retail rates.

Gas prices statewide went up by 50 percent this year over last for the average residential customer in response to the jump in wholesale prices.

Electric utilities around the region also raised rates and are forecasting rate increases, not decreases.

While wholesale electricity prices could indeed spike when the water runs low and the temperatures rise, some experts see longer-term relief in natural-gas prices.

Cool weather — which has reduced the demand for power, including gas-fired power generation — has allowed suppliers to put natural gas into storage at record rates.

That means storage could be adequate for the coming winter, Doolan said. New supplies should also be available in time for the coming heating season because of increased drilling.

Electrical supplies from hydropower will also increase if normal rains return to the Northwest this fall. That in turn would decrease reliance on more expensive gas-generated power, dampening the demand and price for natural gas.

Lynda V. Mapes can be reached at 206-464-2736 or lmapes@seattletimes.com.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

John Spear
10/26/01 11:17 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Backup for energy pricing

Harry,

The attached excel file is a summary of our sources for the energy prices from EIA's report. I tried to pull the sections out of the report we want to put in the estimate as backups but they are pdf, gif or some other kinds of files that I can't get into. You will have to go the website or have someone else go there, and find the tables and sections I reference on the spreadsheet. Otherwise I could copy them here and fed ex them to you. I will fax them to you now so you know what they look like.

The website address is: www.eia.doe.gov/oiaf/aeo

I think that will get you there. The tables are mostly in the appendices which have a link in very small print to the left of the text. Table 26 is the only table listed that is in the text itself on page 107.

Jack

Sources for Elec & Gas Prices.:

McCORMICK & BAXTER

10/25/01

SOURCES FOR ASSUMPTIONS FOR NATURAL GAS AND ELECTRICITY PRICING USED IN THE CD ESTIMATES

Annual Energy Outlook 2001 With Projections to 2020
Report #DOE/EIA-0383(2001)
Published by:

Energy Information Administration (EIA)
Office of Integrated Analysis and Forecasting
U.S. Department of Energy

Publication available on the WEB at:
www.eia.doe.gov/oiaf/aeo/

Attached sections and tables of the report:

1. Overview
2. Table 26. Comparison of natural gas forecasts..
3. Table A3. Energy Prices by Sector and Source
4. Table A8. Electricity Supply, Disposition, Prices and Emissions
5. Table A14. Natural Gas Prices, Margins & Revenues (Ref. Case Forecast)
6. Table B14. Natural Gas Prices, Margins & Revenue (Economic Growth Case Comparisons)

From this report the assumptions have been made for the conceptual design estimate as follows:

Natural gas will be available to the site at the price of:	$3.50	per Million Btu
Electricity will be available to the site at the price of :	$0.06	per KW hour

COST IMPACTS OF INCREASED UTILITY RATES

	RATE	UNIT	SCENARIO 1	SCENARIO 2	SCENARIO 3	P&T
GAS						
	$7.00	MMBTU	$20,552,203	$30,813,298	$41,081,657	$0
	$10.00	MMBTU	$38,168,055	$57,224,717	$76,294,566	$0
ELECTRICITY						
	$0.10	KWH	$1,754,725	$2,368,444	$4,181,897	$7,939,200
	$0.30	KWH	$10,491,743	$14,210,649	$19,129,337	$47,638,500

NOTE:

1. Total cost increases are for the life cycle of the project with no present value discount. (7 years for all thermal scenarios and 100 years for the P&T option.)
2. Electricity cost increases for the thermal options assume that co-generation covers cost of electrode power requirements (but not GWTP power) for years 1 & 2 of the heatup and the power requirements of the GWTP for years 3 & 4.
   For years 5 thru 7 of the thermal options the power is from the grid.
3. All power for the P&T option is electrical from the grid (no gas).

John Spear
06/29/01 09:32 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: heron@steamtech.com
Subject: Natural Gas prices for CD estimate - McCormick & Baxter

Harry,

I looked up some reports and projections done by the Energy Information Administration which is within the Dept of Energy. Their report attached which is entitled "US Natural Gas Markets: Recent Trends and Prospects for the Future" talks about the recent spike in gas prices and why they happened. They project (on page 5 of 7 of the Executive Summary) prices to moderate by 2002 to 4.43 per MMBTU. This article is informative but may still be a bit pessimistic. Another publication of the EIA is Table 14 (attached) which projects prices delivered to Industrial Users out to the year 2016. It seems to project pricing in the range of an average of $3.22 to $3.40 per 1000 CFT or about $3.00 to $3.13 per MMBTU over the next 10 years (in 1999 dollars). These are average projections for the whole USA . Another table I got from their website showed average 1999 pricing to Industrial users in California was $3.26 per Thousand CFT while the average for the USA was 3.11. This indicates that the price to California users is somewhat higher than the national average even before the 2000 to 2001 price anomalies kicked in.

In summary I think the rate we are using at $2.50 is unsustainable. Probably could go with the long term projections of Table 14 which would put our price around $3.30 plus about 5% inflation to 2001 or a number at $3.47 or so. (All prices on the Table are 1999 dollars.)

The article, "US Natural Gas Markets.....", is a good justification for not using any of the prices experienced in the last year or so because it explains the breakdown of the El Paso gas line coming into New Mexico and restricting capacity to California and also the reluctance of gas suppliers to sell to PG&E and the other Electricity Co. that was going broke. (The long term projections of Table 14 may even be high because their demand projections include a 3.6% growth or something like that for GDP. I believe the growth of the last year has actually been less than 2%.)

Take a look at the reports and let's adjust the gas costs to something that is probably more in line with government projections. We'd have somewhere to hang our hats at least.

Annual Energy Outlook 2001 - Forecast Comparisons TE> hruler01.gif eialogo3.gif

These files are something of a mystery to me. I saved the files from the doe website but the Table 4 is in the "Annual Energy Outlook 2001..." and the US Natural Gas Markets....." report is the other two files. If you have a problem with them I will fax or give you the website.

Jack

eia.doe.gov

Energy Information Administration

Official Energy Statistics from the U.S. Government

Search

by Google: GO

- Energy A-Z
- What's New
- About Us / Jobs
- Press Releases
- Kid's Page
- Publications
- Historical Data
- Sign Up for Email Updates
- Contact Experts
- Energy Links
- Presentations
- Energy Events
- Privacy/Security

How do you want to access energy information?

Click for a text menu

Or would you like to access specific subject areas?

Need Help?

phone: 202-586-8800
email: infoctr@eia.doe.gov
Specialized Information Services
For Technical Problems
phone: 202-586-8959
email: wmaster@eia.doe.gov
Energy Information Administration, EI 30
1000 Independence Avenue, SW
Washington, DC 20585

Home | Petroleum | Gasoline | Diesel | Natural Gas | Electricity | Coal | Nuclear | Renewables
Alternative Fuels | Prices | States | International | Country Analysis Briefs
Environment | Analyses | Forecasts | Processes | Sectors

Page last modified on 06/13/2001 12:25:21

Fea
Status
Califor
Situati
Gasoli
Fuel U
U.S. Na
Market
Trends
Prospe
Future
Short-
Weekl
Status
Natura
Update
Electri
Restru
Energy
Rankin

F
Pu
Recent
Statist
Annua
Projec

DOE/EIA-0383(2001)

Annual Energy Outlook 2001

With Projections to 2020

December 2000

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

This publication is on the WEB at:
www.eia.doe.gov/oiaf/aeo/

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the U.S. Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

For Further Information . . .

The *Annual Energy Outlook 2001* (*AEO2001*) was prepared by the Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, under the direction of Mary J. Hutzler (mhutzler@eia.doe.gov, 202/586-2222), Director, Office of Integrated Analysis and Forecasting; Susan H. Holte (sholte@eia.doe.gov, 202/586-4838), Director, Demand and Integration Division; James M. Kendell (jkendell@eia.doe.gov, 202/586-9646), Director, Oil and Gas Division; Scott Sitzer (ssitzer@eia.doe.gov, 202/586-2308), Director, Coal and Electric Power Division; and Andy S. Kydes (akydes@eia.doe.gov, 202/586-2222), Senior Modeling Analyst.

For ordering information and questions on other energy statistics available from EIA, please contact EIA's National Energy Information Center. Addresses, telephone numbers, and hours are as follows:

National Energy Information Center, EI-30
Energy Information Administration
Forrestal Building
Washington, DC 20585

Telephone: 202/586-8800
FAX: 202/586-0727
TTY: 202/586-1181
9 a.m. to 5 p.m., eastern time, M-F

E-mail: infoctr@eia.doe.gov
World Wide Web Site: http://www.eia.doe.gov/
FTP Site: ftp://ftp.eia.doe.gov/

Specific questions about the information in this report may be directed to:

Overview, Carbon Dioxide Emissions	Susan H. Holte (sholte@eia.doe.gov, 202/586-4838)
Economic Activity	Ronald Earley (rearley@eia.doe.gov, 202/586-1398)
International Oil Markets	G. Daniel Butler (gbutler@eia.doe.gov, 202/586-9503)
Residential Demand	John Cymbalsky (jcymbals@eia.doe.gov, 202/586-4815)
Commercial Demand	Erin Boedecker (eboedeck@eia.doe.gov, 202/586-4791)
Industrial Demand	T. Crawford Honeycutt (choneycu@eia.doe.gov, 202/586-1420)
Transportation Demand	David Chien (dchien@eia.doe.gov, 202/586-3994)
Electricity Generation, Capacity	J. Alan Beamon (jbeamon@eia.doe.gov, 202/586-2025)
Electricity Prices	Lori Aniti (laniti@eia.doe.gov, 202/586-2867)
Nuclear Energy	Laura Martin (lmartin@eia.doe.gov, 202/586-1494)
Renewable Energy	Thomas Petersik (tpetersi@eia.doe.gov, 202/586-6582)
Oil and Gas Production	Ted McCallister (tmccalli@eia.doe.gov, 202/586-4820)
Natural Gas Markets	Phyllis Martin (pmartin@eia.doe.gov, 202/586-9592)
Oil Refining and Markets	Stacy MacIntyre (smacinty@eia.doe.gov, 202/586-9795)
Coal Supply and Prices	Michael Mellish (mmellish@eia.doe.gov, 202/586-2136)

AEO2001 will be available on the EIA web site at www.eia.doe.gov/oiaf/aeo/ by December 22, 2000. Assumptions underlying the projections and tables of regional and other detailed results will also be available on December 22, 2000, at web sites www.eia.doe.gov/oiaf/assumption/ and /supplement/. Model documentation reports for the National Energy Modeling System (NEMS) and the report *NEMS: An Overview* are available at web site www.eia.doe.gov/bookshelf/docs.html.

Other contributors to the report include Bruce Bawks, Joseph Benneche, Robert Eynon, Edward Flynn, Mark Friedman, Zia Haq, James Hewlett, Jeff Jones, Diane Kearney, Paul Kondis, Thomas Leckey, Han-Lin Lee, James Lockhart, Chetha Phang, Eugene Reiser, Laurence Sanders, David Schoeberlein, Dan Skelly, Kay Smith, Brian Unruh, Dana Van Wagener, Steven Wade, Peggy Wells, and Thomas White.

Preface

The *Annual Energy Outlook 2001* (*AEO2001*) presents midterm forecasts of energy supply, demand, and prices through 2020 prepared by the Energy Information Administration (EIA). The projections are based on results from EIA's National Energy Modeling System (NEMS).

The report begins with an "Overview" summarizing the *AEO2001* reference case. The next section, "Legislation and Regulations," discusses evolving legislative and regulatory issues. "Issues in Focus" discusses the macroeconomic projections, world oil and natural gas markets, oxygenates in gasoline, distributed electricity generation, electricity industry restructuring, and carbon dioxide emissions. It is followed by the analysis of energy market trends.

The analysis in *AEO2001* focuses primarily on a reference case and four other cases that assume higher and lower economic growth and higher and lower world oil prices than in the reference case. Forecast tables for those cases are provided in Appendixes A through C. Alternative cases explore the impacts of varying key assumptions in NEMS—e.g., technology penetration. The major results for the alternative cases are shown in Appendix F. Appendix G briefly describes NEMS, the *AEO2001* assumptions, and the alternative cases.

The *AEO2001* projections are based on Federal, State, and local laws and regulations in effect on July 1, 2000. Pending legislation and sections of existing legislation for which funds have not been appropriated are not reflected in the forecasts. Historical data used for the *AEO2001* projections were the most current available as of July 31, 2000, when most 1999 data but only partial 2000 data were available. Historical data are presented in this report for comparative purposes; documents referenced in the source notes should be consulted for official data values. The projections for 2000 and 2001 incorporate the short-term projections from EIA's September 2000 *Short-Term Energy Outlook*.

The *AEO2001* projections are used by Federal, State, and local governments, trade associations, and other planners and decisionmakers in the public and private sectors. They are published in accordance with Section 205c of the Department of Energy Organization Act of 1977 (Public Law 95 91), which requires the EIA Administrator to prepare annual reports on trends and projections for energy use and supply.

The projections in *AEO2001* are not statements of what will happen but of what might happen, given the assumptions and methodologies used. The projections are business-as-usual trend forecasts, given known technology, technological and demographic trends, and current laws and regulations. Thus, they provide a policy-neutral reference case that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes. All laws are assumed to remain as currently enacted; however, the impacts of emerging regulatory changes, when defined, are reflected.

Because energy markets are complex, models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior. Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Behavioral characteristics are indicative of real-world tendencies rather than representations of specific outcomes.

Energy market projections are subject to much uncertainty. Many of the events that shape energy markets are random and cannot be anticipated, including severe weather, political disruptions, strikes, and technological breakthroughs. In addition, future developments in technologies, demographics, and resources cannot be foreseen with any degree of certainty. Many key uncertainties in the *AEO2001* projections are addressed through alternative cases.

EIA has endeavored to make these projections as objective, reliable, and useful as possible; however, they should serve as an adjunct to, not a substitute for, analytical processes in the examination of policy initiatives.

The Office of Integrated Analysis and Forecasting dedicates this report in memory of Richard Newcombe (1941-2000). Richard worked on the coal forecasts in past AEOs; his expertise and understanding of the coal industry, as well as his attention to detail, are greatly missed.

Contents

	Page
Overview	1
Legislation and Regulations	9
Introduction	10
Nitrogen Oxide Emission Caps	11
FERC Order 2000	11
Updates on State Renewable Portfolio Standards and Renewable Energy Mandates	12
FERC Order 637	12
Royalty Rules	13
Tier 2 Vehicle Emissions and Gasoline Sulfur Standards	14
Heavy-Duty Vehicle Emissions and Diesel Fuel Quality Standards	15
Banning or Reducing the Use of MTBE in Gasoline	15
Proposed Changes to RFG Oxygen Standard	16
Proposed Limits on Benzene in Gasoline	16
Low-Emission Vehicle Program	17
Appliance Efficiency Standards	18
Petroleum Reserves	19
Issues in Focus	21
Macroeconomic Forecasting with the Revised National Income and Product Accounts (NIPA)	22
World Oil Demand and Prices	27
Natural Gas Supply Availability	28
Phasing Out MTBE in Gasoline	35
Distributed Electricity Generation Resources	37
Restructuring of State Retail Markets for Electricity	41
Carbon Dioxide Emissions in *AEO2001*	45
Market Trends	55
Trends in Economic Activity	56
Economic Growth Cases	57
International Oil Markets	58
Energy Demand	61
Residential Sector Energy Demand	63
Commercial Sector Energy Demand	64
Industrial Sector Energy Demand	65
Transportation Sector Energy Demand	67
Energy Demand in Alternative Technology Cases	69
Electricity	72
Electricity Sales	72
Electricity Generating Capacity	73
Electricity Prices	74
Electricity Generation	75
Nuclear Power	76
Electricity Alternative Cases	77
Electricity from Renewable Sources	79
Oil and Natural Gas	81
Oil and Gas Prices	81
Oil and Gas Reserve Additions	82
Natural Gas Production and Imports	83
Natural Gas Consumption	84
Natural Gas Prices	85
Oil and Gas Alternative Cases	86
Oil Production and Consumption	88
Petroleum Imports and Refining	89
Refined Petroleum Products	90

Contents

Market Trends (continued) **Page**

Coal 92
Coal Production and Prices 92
Coal Mining Labor Productivity 93
Coal Transportation Costs 94
Coal Consumption 95
Coal Exports 96
Emissions 97
Carbon Dioxide and Methane Emissions 97
Emissions from Electricity Generation 99

Forecast Comparisons **101**

List of Acronyms **112**

Notes and Sources **113**

Appendixes
A. Reference Case Forecast 127
B. Economic Growth Case Comparisons 155
C. Oil Price Case Comparisons 183
D. Crude Oil Equivalency Summary 211
E. Household Expenditures 213
F. Results from Side Cases 216
G. Major Assumptions for the Forecasts 230
H. Conversion Factors 251

Index **253**

Tables
1. Summary of results for five cases 7
2. Summer season NO_x emissions budgets for 2003 and beyond 11
3. Effective dates of appliance efficiency standards, 1988-2005 18
4. Historical revisions to growth rates of GDP and its major components, 1959-1998 22
5. Revisions to nominal GDP, 1959-1998 23
6. Revisions to nominal GDP for 1998 23
7. Historical growth in GDP, the labor force, productivity and energy intensity 23
8. Forecast comparison of key macroeconomic variables 25
9. Cost and performance of generic distributed generators 38
10. Projected installed costs and electrical conversion efficiencies for distributed generation technologies by year of introduction and technology, 2000-2020 39
11. Costs of industrial cogeneration systems, 1999 and 2020 40
12. New car and light truck horsepower ratings and market shares, 1990-2020 67
13. Costs of producing electricity from new plants, 2005 and 2020 75
14. Technically recoverable U.S. oil and gas resources as of January 1, 1999 81
15. Natural gas and crude oil drilling in three cases, 1999-2020 82
16. Transmission and distribution revenues and margins, 1970-2020 85
17. Components of residential and commercial natural gas end-use prices, 1985-2020 85
18. Petroleum consumption and net imports in five cases, 1999 and 2020 89
19. Forecasts of economic growth, 1999-2020 102
20. Forecasts of world oil prices, 2000-2020 102
21. Forecasts of average annual growth rates for energy consumption 103
22. Forecasts of average annual growth in residential and commercial energy demand 103
23. Forecasts of average annual growth in industrial energy demand 103
24. Forecasts of average annual growth in transportation energy demand 104
25. Comparison of electricity forecasts 105
26. Comparison of natural gas forecasts 107
27. Comparison of petroleum forecasts 109
28. Comparison of coal forecasts 111

Contents

Figures **Page**

1. Fuel price projections, 1999-2020: *AEO2000* and *AEO2001* compared 2
2. Energy consumption by fuel, 1970-2020 4
3. Energy use per capita and per dollar of gross domestic product, 1970-2020 5
4. Electricity generation by fuel, 1970-2020 5
5. Energy production by fuel, 1970-2020 6
6. Net energy imports by fuel, 1970-2020 6
7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 6
8. Index of energy use per dollar of gross domestic product, 1960-1998 24
9. Annual growth in real gross domestic product: 21-year moving average, 1980-2020 24
10. Projected average annual growth in sectoral output, 1999-2020 25
11. Projected commercial delivered energy intensity by fuel, 1999-2020 26
12. Projected industrial energy intensity by fuel, 1999-2020 26
13. Projected new light-duty vehicle and on-road stock fuel efficiency, 1999-2020 27
14. Refiner acquisition cost of imported crude oil, 1997-2000 27
15. World oil supply and demand forecast in the AEO2001 reference case, 1995-2020 28
16. Net U.S. imports of natural gas, 1970-2020 30
17. Lower 48 natural gas wells drilled, 1970-2020 31
18. Technically recoverable U.S. natural gas resources as of January 1, 1999 32
19. Lower 48 end-of-year natural gas reserves, 1990-2020 32
20. Lower 48 natural gas production in three resource cases, 2000-2020 33
21. Average lower 48 natural gas wellhead prices in three resource cases, 2000-2020 33
22. Lower 48 natural gas production in three technology cases, 1970-2020 34
23. Major new U.S. natural gas pipeline systems, 1990-2000 35
24. Projected buildings sector electricity generation by selected distributed resources in the reference case, 2000-2020 40
25. Cogeneration capacity by type and fuel, 1999 and 2020 41
26. Average annual electricity prices for competitive and noncompetitive regions, 1995-2020 43
27. Projected average regional electricity prices, 2000 and 2020 44
28. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 45
29. U.S. carbon dioxide emissions per capita, 1990-2020 45
30. U.S. carbon dioxide emissions per unit of gross domestic product, 1990-2020 46
31. Projected U.S. energy consumption in three economic growth cases, 1990-2020 48
32. Projected U.S. carbon dioxide emissions in three economic growth cases, 1990-2020 49
33. Projected U.S. energy intensity in three economic growth cases, 1990-2020 49
34. Projected U.S. energy intensity in three technology cases, 1990-2020 50
35. Projected U.S. energy consumption in three technology cases, 1990-2020 50
36. Projected U.S. carbon dioxide emissions in three technology cases, 1990-2020 51
37. Projected average annual real growth rates of economic factors, 1999-2020 56
38. Projected sectoral composition of GDP growth, 1999-2020 56
39. Projected average annual real growth rates of economic factors in three cases, 1999-2020 57
40. Annual GDP growth rate for the preceding 21 years, 1970-2020 57
41. World oil prices in three cases, 1970-2020 58
42. OPEC oil production in three cases, 1970-2020 58
43. Non-OPEC oil production in three cases, 1970-2020 59
44. Persian Gulf share of worldwide oil exports in three cases, 1965-2020 59
45. Projected U.S. gross petroleum imports by source, 1999-2020 60
46. Projected worldwide refining capacity by region, 1999 and 2020 60
47. Primary and delivered energy consumption, excluding transportation use, 1970-2020 61
48. Energy use per capita and per dollar of gross domestic product, 1970-2020 61
49. Delivered energy use by fossil fuel and primary energy use for electricity generation, 1970-2020 62
50. Primary energy consumption by sector, 1970-2020 62
51. Residential primary energy consumption by fuel, 1970-2020 63
52. Residential primary energy consumption by end use, 1990, 1997, 2010, and 2020 63

Contents

Figures (continued) **Page**

53. Efficiency indicators for selected residential appliances, 1999 and 2020 64
54. Commercial nonrenewable primary energy consumption by fuel, 1970-2020 64
55. Commercial primary energy consumption by end use, 1999 and 2020 65
56. Industrial primary energy consumption by fuel, 1970-2020 65
57. Industrial primary energy consumption by industry category, 1994-2020 66
58. Industrial delivered energy intensity by component, 1994-2020 66
59. Transportation energy consumption by fuel, 1975, 1999, and 2020 67
60. Projected transportation stock fuel efficiency by mode, 1999-2020 67
61. Projected technology penetration by mode of travel, 2020 68
62. Projected sales of advanced technology light-duty vehicles by fuel type, 2010 and 2020 68
63. Projected variation from reference case primary energy use by sector in two alternative cases, 2010, 2015, and 2020 69
64. Projected variation from reference case primary residential energy use in three alternative cases, 2000-2020 69
65. Projected cost and investment for selected residential appliances in the best available technology case, 2000-2020 70
66. Present value of investment and savings for residential appliances in the best available technology case, 2000-2020 70
67. Projected variation from reference case primary commercial energy use in three alternative cases, 2000-2020 70
68. Projected industrial primary energy intensity in two alternative cases, 1994-2020 71
69. Projected changes in key components of the transportation sector in two alternative cases, 2020 .. 71
70. Population, gross domestic product, and electricity sales, 1965-2020 72
71. Annual electricity sales by sector, 1970-2020 72
72. Projected new generating capacity and retirements, 2000-2020 73
73. Projected electricity generation capacity additions by fuel type, including cogeneration, 2000-2020 73
74. Fuel prices to electricity generators, 1990-2020 74
75. Average U.S. retail electricity prices, 1970-2020 74
76. Projected electricity generation costs, 2005 and 2020 75
77. Projected electricity generation by fuel, 1999 and 2020 75
78. Nuclear power plant capacity factors, 1973-2020 76
79. Projected operable nuclear capacity in three cases, 1995-2020 76
80. Projected electricity generation costs by fuel type in two advanced nuclear cost cases, 2005 and 2020 77
81. Projected cumulative new generating capacity by type in two cases, 1999-2020 77
82. Projected cumulative new generating capacity by technology type in three economic growth cases, 1999-2020 78
83. Projected cumulative new generating capacity by technology type in three fossil fuel technology cases, 1999-2020 78
84. Grid-connected electricity generation from renewable energy sources, 1970-2020 79
85. Projected nonhydroelectric renewable electricity generation by energy source, 2010 and 2020 79
86. Projected nonhydroelectric renewable electricity generation by energy source in two cases, 2020 .. 80
87. Wind-powered electricity generating capacity in two cases, 1985-2020 80
88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 81
89. U.S. petroleum consumption in five cases, 1970-2020 81
90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 81
91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 82
92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 82
93. Lower 48 crude oil reserve additions in three cases, 1970-2020 82
94. Natural gas production by source, 1990-2020 83
95. Natural gas production, consumption, and imports, 1970-2020 83
96. Natural gas consumption by sector, 1990-2020 84

Figures (continued)

Page

97. Projected pipeline capacity expansion by Census division, 1999-2020 84
98. Projected pipeline capacity utilization by Census division, 1999 and 2020 84
99. Natural gas end-use prices by sector, 1970-2020 85
100. Wellhead share of natural gas end-use prices by sector, 1970-2020 85
101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 86
102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 86
103. Lower 48 crude oil production in three technology cases, 1970-2020 87
104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 87
105. Crude oil production by source, 1970-2020 88
106. Petroleum supply, consumption, and imports, 1970-2020 88
107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 89
108. Domestic refining capacity in three cases, 1975-2020 89
109. Petroleum consumption by sector, 1970-2020 90
110. Consumption of petroleum products, 1970-2020 90
111. U.S. ethanol consumption, 1993-2020 91
112. Components of refined product costs, 1999 and 2020 91
113. Coal production by region, 1970-2020 92
114. Average minemouth price of coal by region, 1990-2020 92
115. Coal mining labor productivity by region, 1990-2020 92
116. Labor cost component of minemouth coal prices, 1970-2020 93
117. Average minemouth coal prices in three mining cost cases, 1990-2020 93
118. Projected change in coal transportation costs in three cases, 1999-2020 94
119. Projected variation from reference case projections of coal demand in two economic growth cases, 2020 94
120. Electricity and other coal consumption, 1970-2020 95
121. Projected coal consumption in the industrial and buildings sectors, 2010 and 2020 95
122. Projected U.S. coal exports by destination, 2010 and 2020 96
123. Projected coal production by sulfur content, 2010 and 2020 96
124. Projected carbon dioxide emissions by sector, 2000, 2010, and 2020 97
125. Projected carbon dioxide emissions by fuel, 2000, 2010, and 2020 97
126. Projected carbon dioxide emissions from electricity generation by fuel, 2000, 2010, and 2020 98
127. Projected methane emissions from energy use, 2005-2020 98
128. Projected sulfur dioxide emissions from electricity generation, 2000-2020 99
129. Projected nitrogen oxide emissions from electricity generation, 2000-2020 99

Overview

Key Energy Issues to 2020

Currently, most attention in energy markets is focused on near-term issues of world oil supply and prices, U.S. natural gas prices, and the transition to restructured electricity markets in several regions of the country. The *Annual Energy Outlook 2001* (*AEO2001*) addresses the longer-term trends of electricity industry restructuring, fossil fuel supply and prices, and the impacts of economic growth on projected energy use and carbon dioxide emissions. *AEO2001* does not project short-term events, such as supply disruptions or severe weather.

The *AEO2001* projections assume a transition to full competitive pricing of electricity in States with specific deregulation plans—California, New York, New England, the Mid-Atlantic States, Illinois, Texas, Oklahoma, Michigan, Ohio, Arizona, New Mexico, and West Virginia. Other States are assumed to continue cost-of-service electricity pricing. A transition from regulated to competitive prices over a 10-year period from the beginning of restructuring in each region, and implementation of the provisions of California legislation regarding price caps, are assumed. Increased competition in electricity markets is also represented through assumed changes in the financial structure of the industry and efficiency and operating improvements.

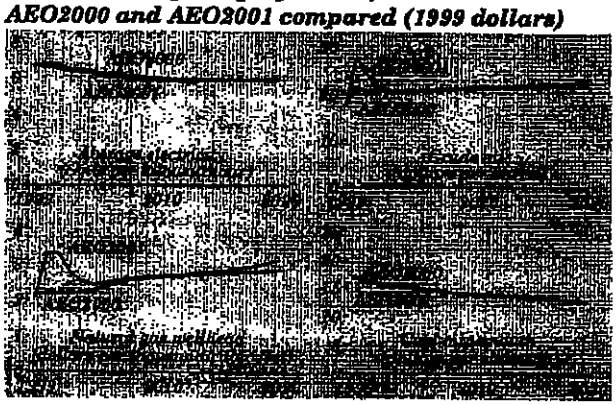
World oil prices fell sharply through most of 1997 and 1998, due in part to economic developments in East Asia and the resulting oversupply of oil. Beginning in 1999, actions by the Organization of Petroleum Exporting Countries (OPEC) and some non-OPEC countries to restrain oil production have increased world oil prices. U.S. natural gas prices have also increased in 2000 due to higher than expected demand and to tight supplies caused by reduced drilling in reaction to low prices in 1998. Oil and gas markets are addressed on pages 27 and 28.

The projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in *AEO2001* than in *AEO2000*, an average annual rate of 3.0 percent from 1999 to 2020, compared with 2.1 percent in *AEO2000*. Although part of the upward revision results from statistical and definitional changes in the National Income and Product Accounts, the projections also reflect a more optimistic view of long-run economic growth, which results in higher forecasts of energy consumption and carbon dioxide emissions in *AEO2001* than in *AEO2000*. The macroeconomic projections are discussed on pages 22 and 56.

Prices

The average world oil price is projected to increase from $17.35 per barrel in 1999 (1999 dollars) to about $27.60 per barrel in 2000, falling to about $20.50 per barrel by 2003. In 2020, the projected price reaches $22.41 per barrel (Figure 1), similar to the *AEO2000* projection of $22.33 per barrel. Higher demand in the forecast is offset by higher resource estimates from the U.S. Geological Survey. Projected prices over the next several years are higher in *AEO2001* than in *AEO2000* due to the production cutbacks by OPEC and several non-OPEC nations, a lag in the response of non-OPEC producers to price increases, and renewed demand growth in Asia.

Figure 1. Fuel price projections, 1999-2020: AEO2000 and AEO2001 compared (1999 dollars)



World oil demand is projected to increase from 75.5 million barrels per day in 1999 to 117.4 million barrels per day in 2020—higher than the *AEO2000* projection of 112.4 million barrels per day—due to higher projected demand in the United States, the Middle East, the former Soviet Union, the Pacific Rim developing countries, and China. Projected growth in production in both OPEC and non-OPEC nations leads to relatively slow projected growth of prices through 2020. OPEC oil production is expected to reach 57.6 million barrels per day in 2020, nearly double the 29.9 million barrels per day in 1999, assuming sufficient capital to expand production capacity. The United Nations resolution limiting Iraqi oil exports is assumed to remain in place through 2001. Once sanctions are lifted, Iraqi oil production is expected to reach 3.5 million barrels per day within 2 years and about 5 million barrels per day within a decade.

The June 2000 recoverable oil resources assessment by the U.S. Geological Survey raised world resources by about 700 billion barrels from the 1994 assessment. As a result, non-OPEC oil production is expected to increase from 44.8 million barrels per day to 59.5 million barrels per day between 1999 and 2020, or 2.9 million barrels per day higher than in *AEO2000*. Production from the Caspian Basin is expected to reach 6 million barrels per day by 2020 with continued expansion of production from the offshore regions of West Africa and the North Sea. Both Brazil and Colombia are expected to be producing 1 million barrels per day before 2005, and production in Mexico and Canada is also expected to increase.

The average wellhead price of natural gas is projected to increase from $2.08 per thousand cubic feet in 1999 to about $3.30 per thousand cubic feet in 2000 and 2001, then decline through 2004. The projected price reaches $3.13 per thousand cubic feet in 2020, $0.28 per thousand cubic feet higher than in *AEO2000*, due to higher projected demand. Price increases are expected to be slowed by technological improvements in natural gas exploration and production. Average delivered prices are projected to increase at a slower rate than the wellhead price due to assumed cost reductions from efficiency improvements in the industry.

In *AEO2001*, the average minemouth price of coal is projected to decline from $16.98 per ton in 1999 to $12.70 per ton in 2020, the same price projected in *AEO2000*. Through 2020, the price is expected to decline due to increasing productivity in mining, a shift to lower-cost western production, and competitive pressures on labor costs.

Average electricity prices are projected generally to decline from 6.7 cents per kilowatthour in 1999 to 6.0 cents in 2020, increasing slightly at the end of the forecast due to rising natural gas prices. In 2020, the projected price is slightly higher than the 5.9 cents per kilowatthour projected in *AEO2000*. Higher projections for natural gas prices and for electricity demand—which would require more investment in new generating capacity—lead to the higher price projections. Electricity industry restructuring is expected to contribute to lower prices through reductions in operating and maintenance, administrative, and other costs. Federal Energy Regulatory Commission actions on open access and other changes for competitive markets enacted by some State public utility commissions are included in the projections, as noted above. Because not all States have deregulated their electricity markets, the projections do not represent a fully restructured electricity market. State legislative actions to deregulate the electricity industry are discussed on page 41.

Consumption

Total energy consumption is projected to increase from 96.1 quadrillion British thermal units (Btu) to 127.0 quadrillion Btu between 1999 and 2020, an average annual increase of 1.3 percent. In 2020, this forecast is about 6 quadrillion Btu higher than projected in *AEO2000*, primarily because higher projected economic growth leads to higher demand forecasts in all end-use sectors.

Total residential energy consumption is projected to grow at an average rate of 1.2 percent per year, with the most rapid growth expected for computers, electronic equipment, and appliances. In 2020, the projected residential demand is 24.4 quadrillion Btu, 1.4 quadrillion Btu higher than in *AEO2000*. Higher projected economic growth results in higher forecasts for both disposable personal income and housing starts, increasing equipment purchases and raising the projected housing stock in 2020 by 1.5 percent. *AEO2001* also forecasts that new houses will become larger over time.

Commercial energy demand is projected to grow at an average annual rate of 1.4 percent, reaching 20.8 quadrillion Btu in 2020, 2.6 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth in *AEO2001*, commercial floorspace is projected to grow more rapidly and, in 2020, is estimated to be 11 percent higher than projected in *AEO2000*. The most rapid increases in energy use are expected for computers, office equipment, and telecommunications and other equipment.

Industrial energy demand is projected to increase at an average rate of 1.0 percent per year, reaching 43.4 quadrillion Btu in 2020, 1.2 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth, total industrial gross output is estimated to grow at an average annual rate of 2.6 percent from 1999 to 2020, compared with 1.9 percent in *AEO2000*; however, recent data indicate more rapid improvements in industrial energy intensity than previously estimated. Also, average annual growth in non-energy-intensive manufacturing is expected to be 3.3 percent, compared with 1.2 percent for energy-intensive manufacturing. Through 2020,

more rapid assumed declines in industrial energy intensity, compared with *AEO2000*, are projected to offset some of the increase in demand that might be expected with higher industrial output. Cogeneration capacity is projected to increase by 19 gigawatts by 2020, 10 gigawatts more than in *AEO2000*.

Energy demand for transportation is projected to grow at an average annual rate of 1.8 percent, to 38.5 quadrillion Btu in 2020, 1.0 quadrillion Btu higher than in *AEO2000*. In *AEO2001*, the projections for light-duty vehicle and freight travel are higher than in *AEO2000* as a result of higher projected growth in personal income and industrial output. Higher light-duty vehicle travel in the forecast is partially offset by higher vehicle efficiency. New vehicle efficiency in 2020 is projected to be higher by 0.9 and 1.9 miles per gallon for new cars and light trucks, respectively, than in *AEO2000*, due to a reevaluation of the competitive potential of advanced technology vehicles.

The projections incorporate efficiency standards for new energy-using equipment in buildings and for motors mandated through 1994 by the National Appliance Energy Conservation Act of 1987 and the Energy Policy Act of 1992, including the refrigerator and fluorescent lamp ballast standards that become effective in July 2001 and April 2005, respectively. These are the only standards that are finalized with effective dates and specific efficiency levels.

Electricity demand is projected to grow by 1.8 percent per year from 1999 through 2020, higher than the rate of 1.3 percent forecast for the same period in *AEO2000*. The higher demand projection results from higher projected economic growth and a reevaluation of the potential for growth in electricity use for a variety of residential and commercial appliances and equipment, including personal computers.

The overall demand for natural gas in the U.S. energy economy is projected to grow by 2.3 percent per year on average (Figure 2), from 21.4 trillion cubic feet in 1999 to 34.7 trillion cubic feet in 2020, primarily as a result of rapid projected growth in demand for electricity generation (excluding cogenerators), which is expected to triple between 1999 and 2020. The *AEO2001* forecast for total natural gas demand in 2020 is 3.2 trillion cubic feet higher than in *AEO2000*, mainly as a result of higher projected demand for natural gas in the electricity generation sector.

In *AEO2001*, total coal consumption is projected to increase from 1,035 million tons in 1999 to 1,297 million tons in 2020, an average increase of 1.1 percent per year. The 2020 projection is 18 million tons higher than in *AEO2000*, due to higher projected demand for industrial uses and for electricity generation, which constitutes about 90 percent of the demand for coal.

Petroleum demand is projected to grow from 19.5 million barrels per day in 1999 to 25.8 million in 2020—an average rate of 1.3 percent per year—led by growth in the transportation sector, which accounts for about 70 percent of U.S. petroleum consumption. Projected demand in 2020 is higher than in *AEO2000* by 730 thousand barrels per day primarily due to a higher projection for transportation fuel use.

Renewable fuel consumption, including ethanol for gasoline blending, is projected to grow at an average rate of 1.1 percent per year through 2020, primarily as a result of State mandates. In 2020, about 55 percent of renewables are used for electricity generation and the rest for dispersed heating and cooling, industrial uses (including cogeneration), and fuel blending. The *AEO2001* forecast for renewable energy demand in 2020 is 0.4 quadrillion Btu higher than in *AEO2000*, mainly due to higher projected use of biomass in the industrial sector.

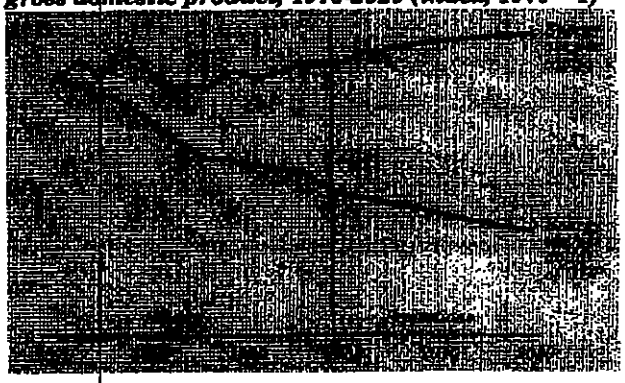
Figure 2. Energy consumption by fuel, 1970-2020 (quadrillion Btu)

Energy Intensity

Between 1970 and 1986, energy intensity, measured as energy use per dollar of GDP, declined at an average annual rate of 2.3 percent as the economy shifted to less energy-intensive industries and more efficient technologies in light of energy price increases (Figure 3). With slower price increases (and price

declines in some sectors) and growth of more energy-intensive industries, intensity declines moderated to an average of 1.3 percent per year between 1986 and 1999. Energy intensity is projected to decline at an average annual rate of 1.6 percent through 2020 as efficiency gains and structural shifts in the economy offset the expected growth in demand for energy services. The projected improvement is more rapid than in *AEO2000*, due to more rapid projected efficiency improvements in the industrial sector and growth in the non-energy-intensive industries.

Figure 3. Energy use per capita and per dollar of gross domestic product, 1970-2020 (index, 1970 = 1)



Energy use per person generally declined from 1970 through the mid-1980s, then rose as energy prices fell. Per capita energy use is projected to increase slightly in the forecast as efficiency gains only partially offset higher demand for energy services.

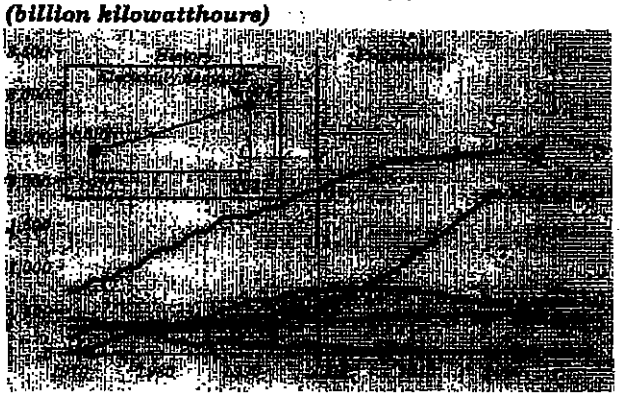
Electricity Generation

Electricity generation fueled by natural gas and coal is projected to increase through 2020 to meet growing demand for electricity and offset the projected retirement of existing nuclear units (Figure 4). The *AEO2001* projections for generation from natural gas, coal, and nuclear power are higher than in *AEO2000* as a result of higher projected electricity demand and improved operating costs and performance of nuclear plants. The share of natural gas generation is projected to increase from 16 percent in 1999 to 36 percent in 2020, and the coal share is projected to decline from 51 percent to 44 percent, because electricity industry restructuring favors the less capital-intensive and more efficient natural gas generation technologies.

Nuclear generating capacity is projected to decline from 1999 to 2020 but remains higher than in *AEO2000* due to a reevaluation of the costs of life extension and higher projected natural gas prices. Retirements of nuclear plants in the forecast are based on operating and life extension costs compared with the cost of new generating capacity. Of the 97 gigawatts of nuclear capacity available in 1999, 26 gigawatts is projected to be retired by 2020, and no new plants are expected to be constructed by 2020.

The use of renewable energy technologies for electricity generation is projected to grow slowly because of the relatively low costs of fossil-fired generation and because electricity restructuring favors less capital-intensive natural gas technologies over coal and baseload renewables. Where enacted, State renewable portfolio standards, which specify a minimum share of generation or sales from renewable sources, contribute to the expected growth of renewables. Total renewable generation, including cogenerators, is projected to increase by 0.7 percent per year and is similar to the projection in *AEO2000*.

Figure 4. Electricity generation by fuel, 1970-2020 (billion kilowatthours)

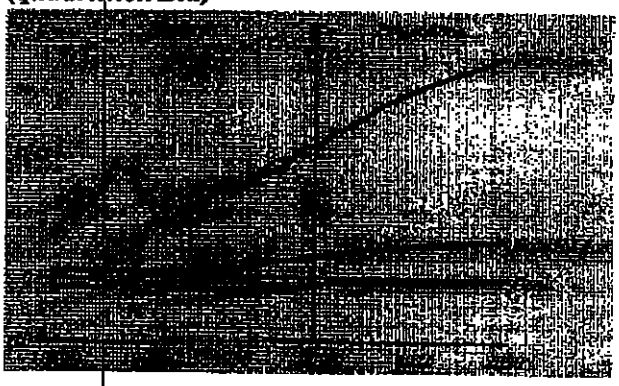


Production and Imports

U.S. crude oil production is projected to decline at an average annual rate of 0.7 percent from 1999 to 2020, to 5.1 million barrels per day. Advances in exploration and production technologies do not offset declining oil resources. This forecast is 0.2 million barrels per day lower in 2020 than in *AEO2000*. Projected production is higher in the earlier years of the forecast when projected prices are higher, contributing to lower production later. Projected increases in natural gas plant liquids production and refinery gains generally offset the decline in crude oil production (Figure 5). The share of petroleum demand met by net imports is projected to increase from 51 percent in 1999 (measured in barrels per day) to 64 percent in 2020, the same as in *AEO2000*, due to rising demand (Figure 6).

Figure 5. Energy production by fuel, 1970-2020 (quadrillion Btu)

Figure 6. Net energy imports by fuel, 1970-2020 (quadrillion Btu)



U.S. natural gas production is projected to increase from 18.7 trillion cubic feet in 1999 to 29.0 trillion cubic feet in 2020, an average annual rate of 2.1 percent, due to growing demand. Projected production is 2.6 trillion cubic feet higher in 2020 than in *AEO2000*. Net imports of natural gas, primarily from Canada, are projected to increase from 3.4 trillion cubic feet in 1999 to 5.8 trillion cubic feet in 2020. Net imports of liquefied natural gas are expected to increase to 0.7 trillion cubic feet by 2020 as two facilities in the United States—Elba Island, Georgia, and Cove Point, Maryland—are expected to reopen in 2003.

Coal production is projected to increase at an average annual rate of 0.9 percent, from 1,105 million tons in 1999 to 1,331 million tons in 2020, as projected domestic demand grows. Projected production in 2020 is 15 million tons higher than in *AEO2000*, due to higher demand. U.S. net coal exports are projected to decline through 2020, with European demand for U.S. coal expected to decline for environmental reasons and as a result of competition from other producers.

Renewable energy production is projected to increase from 6.6 quadrillion Btu in 1999 to 8.3 quadrillion Btu in 2020, with growth in geothermal, wind, biomass, and landfill gas generation, industrial biomass, and ethanol. Renewables production in 2020 is estimated to be 0.3 quadrillion Btu higher than in *AEO2000*, as a result of higher expected use of biomass in the industrial sector.

Carbon Dioxide Emissions

Carbon dioxide emissions from energy use are projected to increase at an average rate of 1.4 percent per year from 1,511 to 2,041 million metric tons carbon equivalent between 1999 and 2020 (Figure 7). Projected emissions in 2020 are higher by 62 million metric tons carbon equivalent than in *AEO2000*, due mainly to higher projected economic growth. Higher projected growth in households, commercial floorspace, industrial output, and disposable income leads to higher forecasts for end-use demand and electricity generation. Partly offsetting these trends are more rapid projected declines in industrial energy intensity and higher projected nuclear generation than in *AEO2000*.

Figure 7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 (million metric tons carbon equivalent)

The projections do not include future legislative or regulatory actions that might be taken to reduce carbon dioxide emissions but do include certain voluntary actions to reduce energy demand and emissions. Carbon dioxide emissions and international negotiations for emissions reductions are discussed on pages 45 and 97.

Table 1. Summary of results for five cases

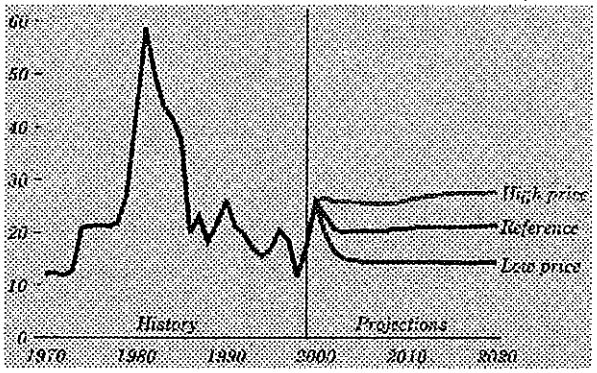
Sensitivity Factors	1998	1999	2020 Reference	2020 Low Economic Growth	2020 High Economic Growth	2020 Low World Oil Price	2020 High World Oil Price
Primary Production (quadrillion Btu)							
Petroleum	15.68	15.08	14.79	14.08	15.42	13.21	16.34
Natural Gas	19.19	19.16	29.79	27.44	31.17	28.99	29.80
Coal	23.76	23.09	26.95	25.97	29.42	26.20	27.68
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.62	6.58	8.31	7.91	8.75	8.19	8.37
Other	0.65	1.65	0.34	0.32	0.34	0.33	0.40
Total Primary Production	**73.10**	**73.35**	**86.30**	**81.64**	**91.40**	**83.02**	**88.67**
Net Imports (quadrillion Btu)							
Petroleum (including SPR)	20.95	21.12	35.22	32.18	38.76	39.57	32.38
Natural Gas	3.06	3.48	5.94	5.72	5.96	5.87	5.66
Coal/Other (- indicates export)	-1.41	-0.85	-0.47	-0.52	-0.36	-0.47	-0.47
Total Net Imports	**22.60**	**23.73**	**40.69**	**37.38**	**44.36**	**44.97**	**37.57**
Discrepancy	0.86	0.94	-0.04	0.05	-0.10	0.60	-0.17
Consumption (quadrillion Btu)							
Petroleum Products	37.16	38.03	50.59	46.73	54.82	52.74	49.49
Natural Gas	21.96	21.95	35.57	33.00	36.97	34.68	35.31
Coal	21.61	21.43	26.20	25.19	28.77	25.45	26.92
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.63	6.59	8.31	7.92	8.76	8.20	8.38
Other	0.29	0.34	0.23	0.23	0.23	0.23	0.23
Total Consumption	**94.84**	**96.14**	**127.03**	**118.98**	**135.86**	**127.39**	**126.42**
Prices (1999 dollars)							
World Oil Price (dollars per barrel)	12.02	17.35	22.41	21.16	23.51	15.10	28.42
Domestic Natural Gas at Wellhead (dollars per thousand cubic feet)	2.02	2.08	3.13	2.66	3.68	3.01	3.25
Domestic Coal at Minemouth (dollars per short ton)	18.02	18.98	12.70	12.79	12.80	12.84	12.87
Average Electricity Price (cents per kilowatthour)	6.8	6.7	6.0	5.6	6.4	5.9	6.1
Economic Indicators							
Real Gross Domestic Product (billion 1996 dollars)	8,516	8,876	16,515	14,757	18,202	16,565	16,474
(annual change, 1999-2020)	—	—	3.0%	2.5%	3.5%	3.0%	3.0%
GDP Chain-Type Price Index (index, 1996=1.00)	1.029	1.045	1.680	1.807	1.472	1.674	1.686
(annual change, 1999-2020)	—	—	2.3%	2.9%	1.6%	2.3%	2.3%
Real Disposable Personal Income (billion 1996 dollars)	6,165	6,363	11,842	10,907	12,739	11,902	11,786
(annual change, 1999-2020)	—	—	3.0%	2.6%	3.4%	3.0%	3.0%
Gross Manufacturing Output (billion 1992 dollars)	3,704	3,749	6,726	6,149	7,735	6,730	6,724
(annual change, 1999-2020)	—	—	2.8%	2.4%	3.5%	2.8%	2.8%
Energy Intensity							
(thousand Btu per 1996 dollar of GDP)	11.14	10.84	7.70	8.07	7.47	7.69	7.68
(annual change, 1999-2020)	—	—	-1.6%	-1.4%	-1.8%	-1.6%	-1.6%
Carbon Dioxide Emissions							
(million metric tons carbon equivalent)	1,495	1,511	2,041	1,916	2,193	2,051	2,033
(annual change, 1999-2020)	—	—	1.4%	1.1%	1.8%	1.5%	1.4%

Notes: Specific assumptions underlying the alternative cases are defined in the Economic Activity and International Oil Markets sections beginning on page 56. Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, supplemental natural gas, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. Some refinery inputs appear as petroleum product consumption. Other consumption includes net electricity imports, liquid hydrogen, and methanol.

Sources: Tables A1, A19, A20, B1, B19, B20, C1, C19, and C20.

Oil Prices Are Expected To Remain Above Low 1998 Levels

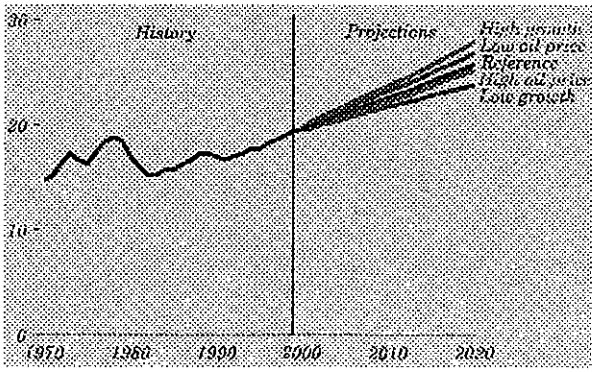
Figure 88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 (1999 dollars per barrel)



Because domestic prices for crude oil are determined largely by the international market, recovery from the 1998 decline in world oil prices led to a steep increase in wellhead prices for crude oil in the lower 48 States in 1999 and 2000. After 2000, prices are projected to decline initially, then increase through the rest of the forecast. Prices are expected to remain above 1998 levels in all cases, with wellhead prices projected to decrease by 0.6 percent per year on average from 1999 to 2020 in the low world oil price case and to increase by 1.3 and 2.5 percent per year on average in the reference and high world oil price cases, respectively (Figure 88).

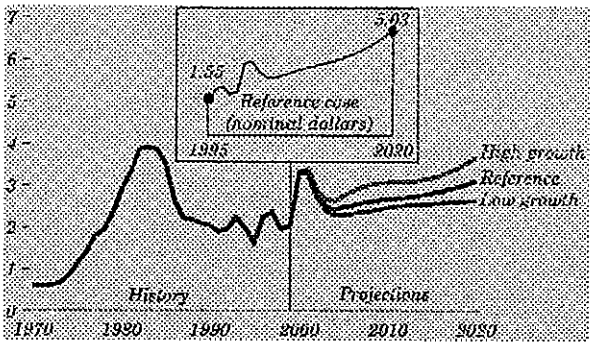
U.S. petroleum consumption is projected to rise in all the *AEO2001* cases (Figure 89). Total petroleum product supplied is projected to range from 23.8 million barrels per day in the low economic growth case to 28.0 million in the high growth case, as compared with 19.5 million barrels per day in 1999.

Figure 89. U.S. petroleum consumption in five cases, 1970-2020 (million barrels per day)



Rising Demand Increases Natural Gas Prices in All Economic Growth Cases

Figure 90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 (1999 dollars per thousand cubic feet)



Wellhead prices for natural gas in the lower 48 States are projected to increase on average by 1.2, 2.0, and 2.8 percent per year in the low economic growth, reference, and high economic growth cases, respectively (Figure 90). In the reference case, gas prices are projected to increase from $2.08 per thousand cubic feet in 1999 to $3.13 in 2020. The increases reflect the rising demand projected for natural gas and its expected impact on the natural progression of the discovery process from larger and more profitable fields to smaller, less economical ones. The projected price increases also reflect more production expected from higher cost sources, such as unconventional gas recovery. Growth in lower 48 unconventional gas production is projected to range from 2.5 to 3.5 percent per year across cases, compared with a projected range of 2.3 to 2.7 percent per year for conventional sources. Technically recoverable resources (Table 14) are expected to remain more than adequate overall to meet the projected production increases.

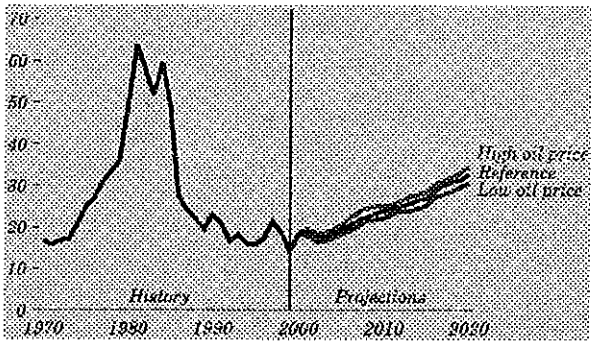
Although natural gas consumption (and thus production and prices) is projected to rise in all three cases, the price increases are expected to be tempered by the beneficial impacts of technological progress on both the discovery process and production operations.

Table 14. Technically recoverable U.S. oil and gas resources as of January 1, 1999

Total U.S. resources	Crude oil (billion barrels)	Natural gas (trillion cubic feet)
Proved	22	164
Unproved	121	1,117
Total	144	1,281

Rising Prices and Lower Drilling Costs Increase Well Completions

Figure 91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 (thousand successful wells)



Both exploratory drilling and developmental drilling are projected to increase in the forecast (Table 15). With rising prices and declining drilling costs, crude oil and natural gas well completions are projected to increase on average by 3.7 and 4.3 percent per year in the low and high oil price cases, respectively, compared with 4.0 percent in the reference case (Figure 91). The high growth rates projected for oil and gas drilling reflect, in part, the low level of drilling activity in 1999.

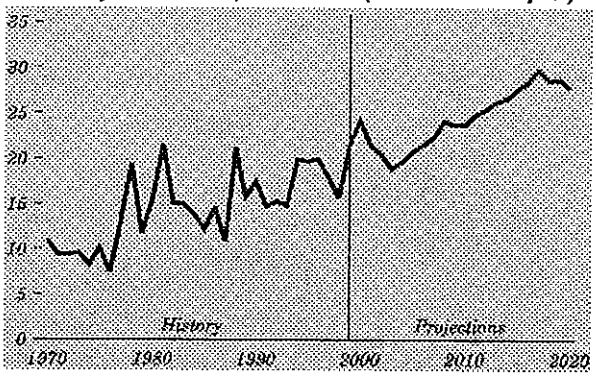
The productivity of natural gas drilling is not expected to decline as much as that of oil drilling, in part because total recoverable gas resources are more abundant than oil resources. At the projected production levels, however, undiscovered recoverable resources of conventional natural gas would decline rapidly in some areas, particularly in the onshore Gulf Coast and offshore Gulf of Mexico regions. The future overall productivity of both oil and gas drilling is necessarily uncertain, given the uncertainty associated with such factors as the extent of the Nation's oil and gas resources [*87*].

Table 15. Natural gas and crude oil drilling in three cases, 1999-2020 (thousand successful wells)

	1999	2000	2010	2020
Natural gas				
Low oil price case		12.8	16.5	22.2
Reference case	10.3	12.8	17.5	23.4
High oil price case		13.0	18.1	24.3
Crude oil				
Low oil price case		5.5	5.8	8.5
Reference case	4.1	5.5	6.5	9.4
High oil price case		5.5	7.0	10.2

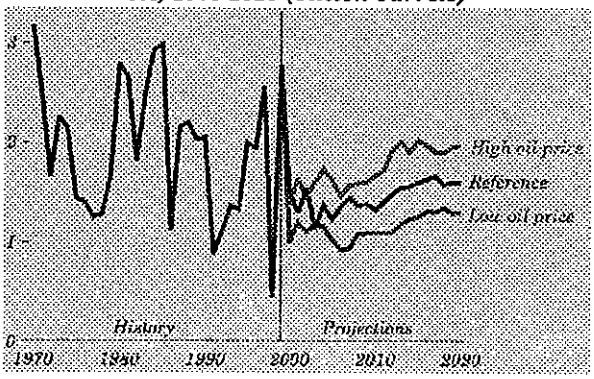
High Levels of Gas Reserve Additions Are Projected Through 2020

Figure 92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 (trillion cubic feet)



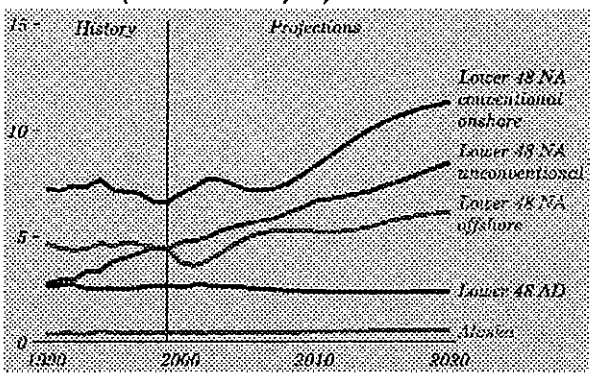
For most of the past two decades lower 48 production of both oil and natural gas has exceeded reserve additions, but the pattern for natural gas reversed from 1994 through 1997. Although reserve additions fell below production in 1998 with the decline in prices, they exceeded production again in 1999. After 2004, rising prices are projected to result in natural gas reserve additions that generally exceed production through 2020 (Figure 92), even with expected increases in demand. The relatively high projected levels of annual gas reserve additions through 2020 reflect an expected increase in exploratory and developmental drilling as a result of higher prices, as well as expected productivity gains from technology improvements comparable to those of recent years. For the most part, total lower 48 crude oil production is projected to continue to exceed total reserve additions (Figure 93), except in the later years in the high world oil price case.

Figure 93. Lower 48 crude oil reserve additions in three cases, 1970-2020 (billion barrels)



Significant New Finds Are Likely To Continue Increases in Gas Production

Figure 94. Natural gas production by source, 1990-2020 (trillion cubic feet)



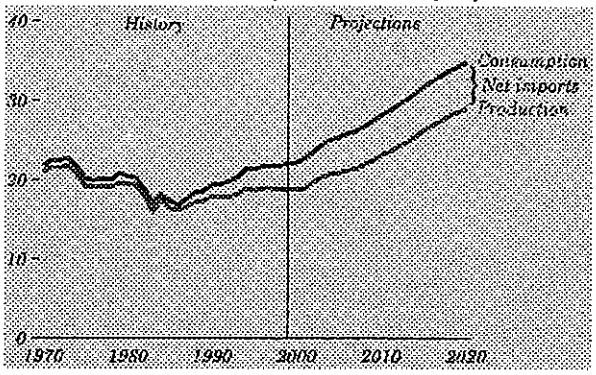
The continuing increase in domestic natural gas production in the forecast is expected to come primarily from lower 48 onshore nonassociated (NA) sources (Figure 94). Conventional onshore production is projected to grow rapidly from 2006 through 2020, increasing in share from 35.5 percent of total U.S. domestic production in 1999 to 39.2 percent of the total in 2020. Gas production from unconventional sources is projected to increase steadily over the forecast as a result of technology advances, playing a key role in meeting projected demand. Offshore production is projected to increase less rapidly but to remain a major source of domestic supply. Innovative use of cost-saving technology in recent years and the expected mid-term continuation of recent huge finds, particularly in the deep waters of the Gulf of Mexico, support the projections.

Natural gas production from Alaska is projected to grow by 1.5 percent per year through 2020, not including gas from the North Slope. The future of North Slope gas is uncertain, however. Current options under consideration include transporting the gas through a pipeline, converting it to liquefied natural gas, and converting it to synthetic petroleum products [*88*].

Production of associated-dissolved (AD) natural gas from lower 48 crude oil reservoirs generally declines in the projections, following the expected pattern of domestic crude oil production. AD gas is projected to account for 8.2 percent of total production in 2020, compared with 14.6 percent in 1999.

Net Imports of Natural Gas Grow in the Projections

Figure 95. Natural gas production, consumption, and imports, 1970-2020 (trillion cubic feet)



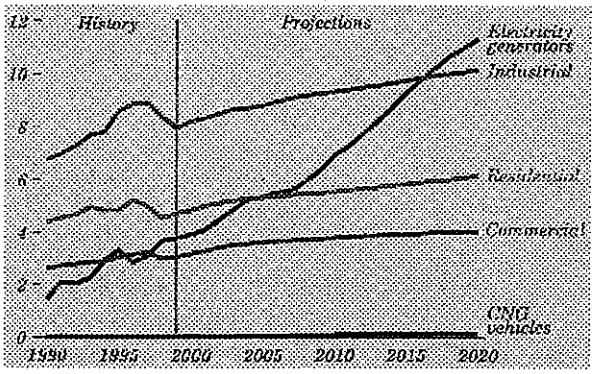
Net natural gas imports are expected to grow in the forecast (Figure 95) from 15.8 percent of total gas consumption in 1999 to 16.7 percent in 2020. Most of the increase is attributable to imports from Canada, which are projected to grow substantially. Most of the additional imports are expected to come from western Canada. In addition, new pipeline capacity is now providing access to eastern supplies. Natural gas from Sable Island, in the offshore Atlantic, began flowing on January 1, 2000.

Mexico has a considerable natural gas resource base, but its indigenous production is unlikely to increase sufficiently to satisfy rising demand. Since 1984, U.S. natural gas trade with Mexico has consisted primarily of exports. That trend is expected to continue throughout the forecast, especially in light of continuing additions to cross-border pipeline capacity. U.S. exports to Mexico are projected to grow from 60 billion cubic feet in 1999 to 520 billion cubic feet in 2020.

Imports of liquefied natural gas (LNG) are projected to increase by 8.0 percent per year on average, resulting in part from the expected reactivation of both the Elba Island terminal in Georgia and the Cove Point terminal in Maryland in 2003. LNG is not expected to grow beyond a regionally significant source of U.S. supply, however. LNG imports are projected to reach a level of 0.81 trillion cubic feet in 2020, compared with 0.16 trillion cubic feet in 1999.

Projected Increases in Natural Gas Use Are Led by Electricity Generators

Figure 96. Natural gas consumption by sector, 1990-2020 (trillion cubic feet)

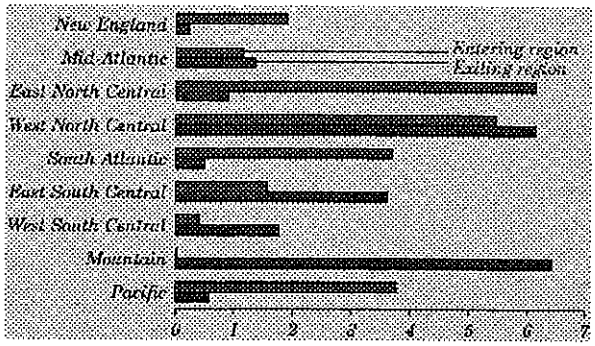


In all the *AEO2001* cases, total natural gas consumption is projected to increase from 1999 to 2020. The projections for domestic consumption in 2020 range from 32.2 trillion cubic feet per year in the low economic growth case to 36.1 trillion cubic feet in the high growth case, as compared with an estimated 21.4 trillion cubic feet in 1999. Although rising demand by electricity generators accounts for 57 percent of the increase in the reference case, growth is also expected in the residential, commercial, industrial, and transportation sectors (Figure 96). Natural gas consumption in the electricity generation sector is projected to grow steadily throughout the forecast as demand for electricity increases and retiring nuclear and older oil and gas steam plants are replaced by gas turbines and combined-cycle facilities.

In the reference case, natural gas consumption for electricity generation (excluding cogeneration) is projected to increase from 3.8 trillion cubic feet in 1999 to 11.3 trillion cubic feet in 2020. In 2017 electricity generation is projected to surpass the industrial sector as the largest consumer of natural gas. Although coal prices to the electricity generation sector are projected to fall throughout the forecast, lower capital costs, shorter construction lead times, higher efficiencies, and lower emissions are expected to give gas-fired generators an advantage over coal-fired plants for new capacity additions in most regions of the United States. Natural-gas-fired facilities are less capital-intensive than coal, nuclear, or renewable electricity generation plants. In addition, the environmental advantages of natural gas are expected to favor increased utilization of existing gas-fired power plants.

Gas Pipeline Capacity Expansion Is Needed To Serve New Markets

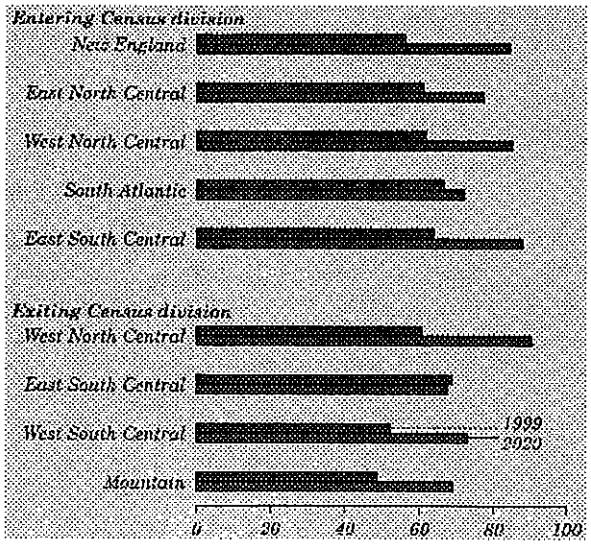
Figure 97. Projected pipeline capacity expansion by Census division, 1999-2020 (billion cubic feet per day)



Projected growth in natural gas consumption will require additional pipeline capacity. Expansion of interstate capacity (Figure 97) will be needed to provide access to new supplies and to serve expanding markets. Expansion is projected to proceed at an average rate of 1.0 percent per year in the forecast.

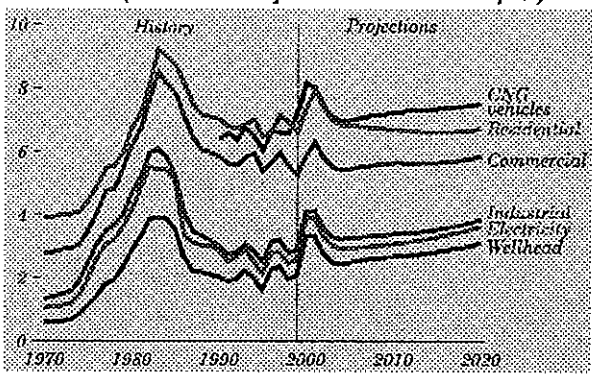
The greatest increases in capacity are expected along the corridors that provide access to Canadian, Gulf Coast, and Mountain region supplies and deliver them to the South Atlantic, Pacific, and Northeast regions. In all regions, growth in new pipeline construction is expected to be tempered by higher utilization of existing pipeline capacity (Figure 98).

Figure 98. Projected pipeline capacity utilization by Census division, 1999 and 2020 (percent)



Competitive Markets Keep Residential Gas Prices in Check

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



Consumer prices for natural gas in all the end-use sectors are projected to be higher in 2020 that they were in 1999 (Figure 99), but prices in the residential and transportation sectors are expected to remain within 5 percent of 1999 levels. The limited price increases in the forecast reflect expectations for declining distribution margins, due in part to anticipated efficiency improvements in an increasingly competitive market. Margins in the industrial sector are projected to remain relatively constant, and growth in end-use prices is expected to result mainly from wellhead price increases. In the electricity generation sector, expected increases in both pipeline margins and wellhead prices combine to yield a projected 1.6-percent average annual increase in end-use prices.

Compared with their rise and decline over the 1970 to 1999 period, transmission and distribution revenues in the natural gas industry are projected to grow relatively steadily from 2000 forward, increasing overall at an average rate of 1.1 percent per year (Table 16). Declines in margins are expected to be balanced by higher volumes.

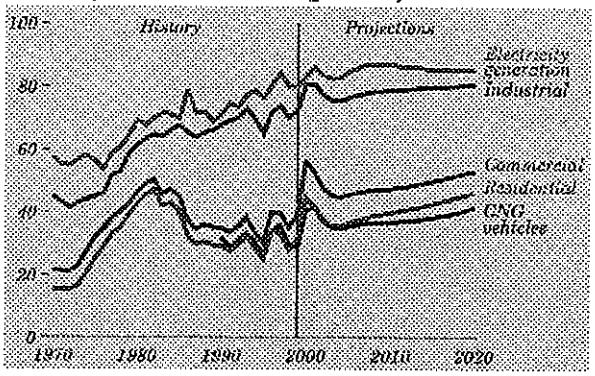
Table 16. Transmission and distribution revenues and margins, 1970-2020

	1970	1985	1999	2010	2015	2020
T&D revenues (billion 1999 dollars)	30.73	49.62	39.86	44.59	47.01	49.82
End-use consumption (trillion cubic feet)	19.21	15.97	21.41	28.05	31.61	34.73
Average margin* (1999 dollars per thousand cubic feet)	1.62	3.14	2.04	1.74	1.63	1.57

*Revenue divided by end-use consumption.

Distribution Costs Claim a Smaller Share of Residential Gas Prices

Figure 100. Wellhead share of natural gas end-use prices by sector, 1970-2020 (percent)



With distribution margins projected to decline, the wellhead shares of end-use prices generally increase in the forecast (Figure 100). The greatest impact is expected in the residential and commercial markets, where most customers purchase gas through local distribution companies (LDCs). In the electricity generation sector, the majority of customers do not purchase from distributors.

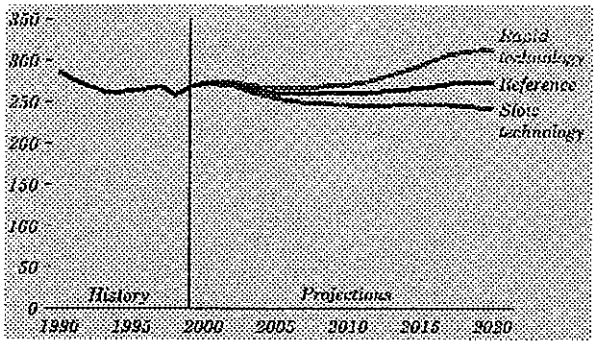
Changes have been seen historically in all components of end-use prices (Table 17). Pipeline margins dropped significantly between 1985 and 1999 with industry restructuring, and the decline is projected to continue through 2010. From 2010 to 2020, pipeline margins are projected to remain relatively flat. LDC margins in the residential and commercial sectors were above 1985 levels in 1999, but efficiency improvements and other impacts of restructuring are expected to exert downward pressure on distribution costs, and lower margins are projected for both the residential and commercial sectors in 2010 and 2020.

Table 17. Components of residential and commercial natural gas end-use prices, 1985-2020 (1999 dollars per thousand cubic feet)

Price Component	1985	1999	2010	2020
Wellhead price	3.38	2.08	2.69	3.13
Citygate price	5.05	3.10	3.60	4.04
Pipeline margin	1.67	1.02	0.91	0.91
LDC margin				
Residential	3.19	3.59	3.10	2.69
Commercial	2.36	2.39	2.05	1.82
End-use price				
Residential	8.24	6.69	6.70	6.73
Commercial	7.41	5.49	5.65	5.86

Technology Advances Could Improve Finding and Drilling Success Rates

Figure 101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 (quadrillion Btu)



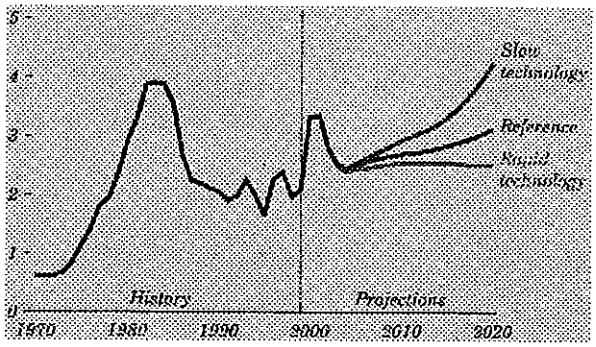
In the forecast, major advances in data acquisition, data processing, and the display and integration of seismic data with other geologic data—combined with lower cost computer power and experience gained with new techniques—are projected to continue putting downward pressure on costs while significantly improving finding and success rates. Effective use of improved exploration and production technologies to aid in the discovery and development of resources—particularly, unconventional gas and offshore deepwater fields—will be needed if new reserves are to replace those depleted by production.

Alternative cases assess the sensitivity of the projections to changes in success rates, exploration and development costs, and finding rates as a result of technological progress. The assumed technology improvement rates increase and decrease by 25 percent in the rapid and slow technology cases, which are analyzed as fully integrated model runs. All other parameters in the model are at their reference case values, including technology parameters in other energy markets, parameters affecting foreign oil supply, and assumptions about foreign natural gas trade, excluding Canada.

Although gas reserves are projected to make up a slightly larger share of the total in the reference case, total hydrocarbon reserve additions are expected to offset production, keeping total reserves essentially constant throughout the forecast (Figure 101). By 2020, reserves are projected to be 14.4 percent higher in the rapid technology case than in the reference case and 11.3 percent lower in the slow technology case.

Gas Price Projections Change With Technology Assumptions

Figure 102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 (1999 dollars per thousand cubic feet)



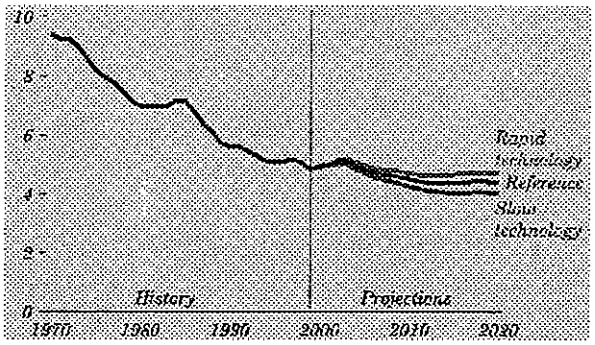
The natural gas price projections are highly sensitive to changes in assumptions about technological progress (Figure 102). Lower 48 wellhead prices are projected to increase at an average annual rate of 3.4 percent in the slow technology case, compared with only 2.0 percent in the reference case, over the projection period. In the rapid technology case, average natural gas wellhead prices are projected to remain relatively flat through 2020 at about $2.50 per thousand cubic feet.

Through 2003, the projections of both price and production levels for lower 48 oil and natural gas are almost identical in the reference case and the two technological progress cases. By 2020, however, natural gas prices are projected to be 35.1 percent higher (at $4.23 per thousand cubic feet) in the slow technology case and 20.1 percent lower (at $2.50 per thousand cubic feet) in the rapid technology case than the reference case level of $3.13 per thousand cubic feet.

Unlike the projections for natural gas prices, those for lower 48 average wellhead prices for crude oil do not vary significantly across the technology cases. In both the rapid and slow technology cases, the projections for crude oil prices vary from the reference case projections by at most $0.14 per barrel. Domestic oil prices are determined largely by the international market; changes in U.S. oil production do not constitute a significant volume relative to the global market.

More Rapid Technology Advances Could Raise Oil Production Slightly

Figure 103. Lower 48 crude oil production in three technology cases, 1970-2020 (million barrels per day)



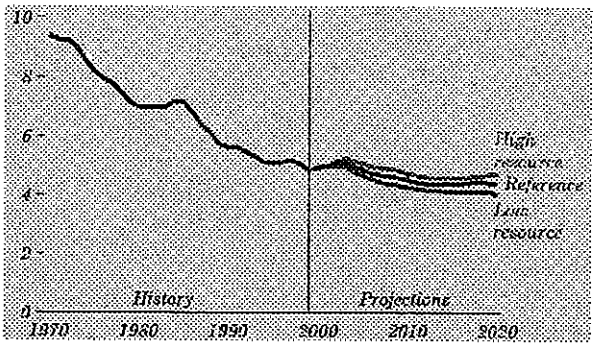
Projections for domestic oil production also are sensitive to changes in technological progress assumptions (Figure 103). In comparison with the projected lower 48 production level of 4.4 million barrels per day in 2020 in the reference case, oil production is projected to increase to 4.7 million barrels per day in the rapid technology case and to decrease to 4.0 million barrels per day in the slow technology case.

Given the assumption that changes in the levels of technology affect only U.S. oil producers, total oil supply adjusts to the variations in technological progress assumptions primarily through changes in imports of crude oil and other petroleum products. Net imports in 2020 are projected to range from a low of 16.1 million barrels per day in the rapid technology case to a high of 17.4 million barrels per day in the slow technology case.

Offshore oil production in the lower 48 States shows more sensitivity than onshore production to changes in technological progress assumptions, because large deepwater fields that are not economically feasible in the slow technology case are projected to become profitable in the rapid technology case. Cumulative offshore production from 1999 through 2020 is projected to be about 745 million barrels (4.9 percent) higher in the rapid technology case than in the reference case and 922 million barrels (6.0 percent) lower in the slow technology case than in the reference case. For onshore production, in contrast, the projected differences are only 3.5 percent and 3.6 percent. The projections for Alaskan oil production vary by about 3.9 percent from the reference case in both the rapid and slow technology cases.

Oil Production Forecasts Vary, Depending on Resource Estimates

Figure 104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 (million barrels per day)



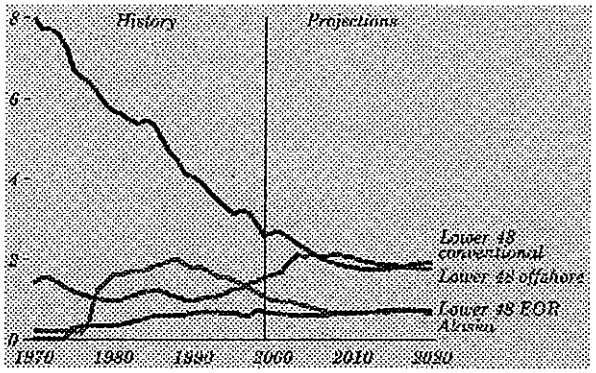
Another important assumption for the projections of domestic oil and gas resources is the size of the domestic resource base. Two alternative cases were used to evaluate the impacts of uncertainty in the resource estimates. In the high and low resource sensitivity cases, the estimates for both undiscovered technically recoverable resources and inferred reserves for conventional onshore and offshore production were increased and decreased, respectively, by 20 percent. As in the other *AEO2001* cases, resources in areas currently restricted from exploration and development were excluded from the resource assumption.

In the high resource case, both oil production levels and industry profits are projected to increase over those projected in the reference case. Lower 48 crude oil production is projected to reach 4.8 million barrels per day in 2020, as compared with 4.4 million barrels per day projected in the reference case (Figure 104). The corresponding projection in the low resource case is 4.0 million barrels per day.

The variations in oil production projections in the two resource sensitivity cases lead to similar variations in the projections of oil import dependence. In the high resource case, with higher projected production levels, net petroleum imports are projected to make up 62 percent of domestic supply in 2020, compared with 64 percent in the reference case. In the low resource case, with lower projected domestic production, imports are projected to make up 68 percent of domestic supply.

Domestic Crude Oil Production Continues To Decline

Figure 105. Crude oil production by source, 1970-2020 (million barrels per day)

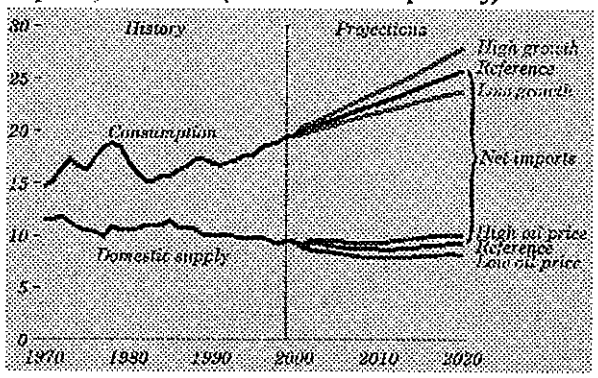


Domestic crude oil production is projected to remain relatively stable from 1999 through 2003 as a result of a favorable price environment and increased success of offshore drilling (Figure 105). A decline in production is projected from 2004 through 2010, followed by another period of projected stable production levels through 2020 as a result of rising prices and continuing improvements in technology [*89*]. In 2020, the projected domestic production level of 5.1 million barrels per day is 0.8 million barrels per day less than the 1999 level.

Conventional onshore production in the lower 48 States, accounting for 44 percent of total U.S. crude oil production in 1999, is projected to decrease to 38 percent in 2020, with production from mature areas expected to decline. Offshore production is projected to range from 1.6 to 2.1 million barrels per day throughout the forecast, surpassing the projected level of lower 48 conventional onshore production from 2006 to 2016. Crude oil production from Alaska is expected to decline at an average annual rate of 2.4 percent between 1999 and 2020. Projected drops in production from most of Alaska's oil fields—particularly Prudhoe Bay, the State's largest producing field—are expected to be offset by production from the National Petroleum Reserve–Alaska (NPRA), which is projected to commence in 2010. Production from the Alaska National Wildlife Refuge (ANWR) is not included, because drilling in the area is currently prohibited. Production from enhanced oil recovery (EOR) [*90*] is expected to slow as it becomes less profitable when oil prices fall in the forecast through 2003, and then to increase along with the world oil price projections until close to the end of the forecast.

Imports Fill the Gap Between Domestic Supply and Demand

Figure 106. Petroleum supply, consumption, and imports, 1970-2020 (million barrels per day)



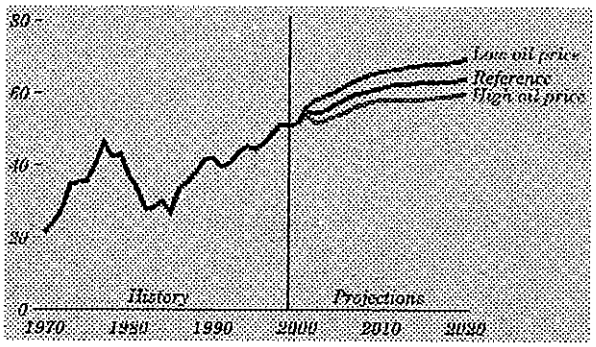
In the reference case, domestic petroleum supply is projected to decline slightly from its 1999 level of 9.5 million barrels per day to 9.3 million barrels per day in 2020 (Figure 106). As U.S. crude oil production falls off, refinery gain and production of natural gas plant liquids are projected to increase. Domestic supply in 2020 is projected to drop to 8.2 million barrels per day in the low oil price case and to rise to 10.1 million barrels per day in the high oil price case.

The greatest variation in petroleum consumption levels is seen across the economic growth cases, with a projected increase of 8.5 million barrels per day over the 1999 level in the high growth case, compared with a projected increase of only 4.4 million barrels per day in the low growth case.

Additional petroleum imports would be needed to fill the projected widening gap between supply and consumption. The greatest gap between supply and consumption is projected in the low world oil price case and the smallest in the low economic growth case. The projections for net petroleum imports in 2020 range from a high of 18.8 million barrels per day in the low oil price case to a low of 15.0 million barrels per day in the low growth case, compared with the 1999 level of 10.0 million barrels per day. The expected value of petroleum imports in 2020 ranges from $115.8 billion in the low price case to $170.8 billion in the high economic growth case. Total annual U.S. expenditures for petroleum imports, which reached a historical peak of $138.9 billion (in 1999 dollars) in 1980 [*91*], were $60.2 billion in 1999.

Growing Dependence on Petroleum Imports Is Projected

Figure 107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 (percent)



In 1999, net imports of petroleum accounted for 51 percent of domestic petroleum consumption. Continued dependence on petroleum imports is projected, reaching 64 percent in 2020 in the reference case (Figure 107). The corresponding import shares of total consumption in 2020 are projected to be 60 percent in the high oil price case and 70 percent in the low price case.

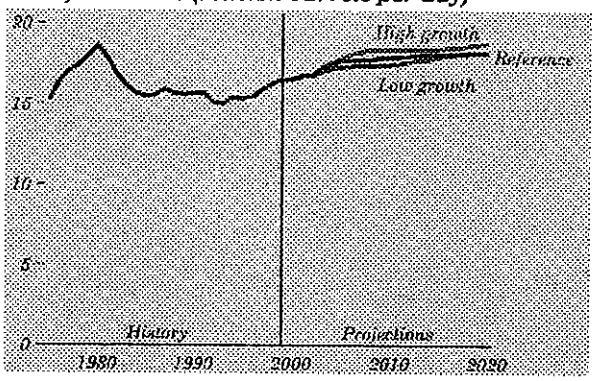
Although crude oil is expected to continue as the major component of petroleum imports, refined products are projected to represent a growing share. More imports would be needed as the projected growth in demand for refined products exceeds the expansion of domestic refining capacity. Refined products are projected to make up 19 percent of net petroleum imports in 2020 in the low economic growth case and 32 percent in the high growth case, as compared with their 13-percent share in 1999 (Table 18).

Table 18. Petroleum consumption and net imports in five cases, 1999 and 2020 (million barrels per day)

Year and projection	Product supplied	Net imports	Net crude imports	Net product imports
1999	19.5	9.9	8.6	1.3
2020				
Reference	25.8	16.5	12.1	4.4
Low oil price	27.0	18.8	13.3	5.5
High oil price	25.3	15.2	11.5	3.7
Low growth	23.9	15.0	12.1	2.9
High growth	28.0	18.2	12.5	5.8

New U.S. Oil Refining Capacity Is Likely To Be at Existing Refineries

Figure 108. Domestic refining capacity in three cases, 1975-2020 (million barrels per day)



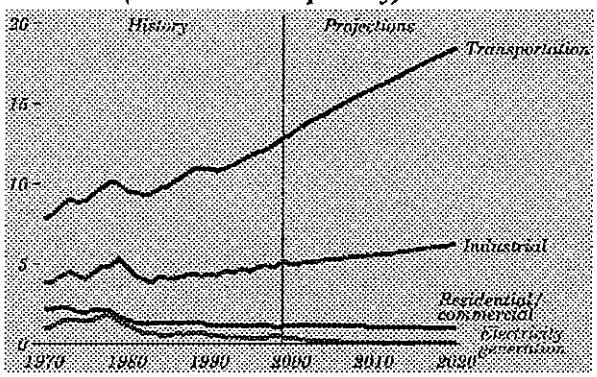
Falling demand for petroleum and the deregulation of the domestic refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity. That trend was reversed in 1995, and 1.2 million barrels per day of distillation capacity had been added by 2000. Financial and legal considerations make it unlikely that new refineries will be built in the United States, but additions at existing refineries are expected to increase total U.S. refining capacity in all the *AEO2001* cases (Figure 108).

Distillation capacity is projected to grow from the 1999 year-end level of 16.5 million barrels per day to 18.2 million in 2020 in the low economic growth case and 18.8 million in the high growth case, compared with the 1981 peak of 18.6 million barrels per day. Almost all the capacity additions are projected to occur on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively throughout the forecast, in a range from 91 percent to 95 percent of design capacity. In comparison, the 1999 utilization rate was 93 percent, well above the rates of the 1980s and early 1990s.

Additional "downstream" processing units are expected to allow domestic refineries to produce less residual fuel, which has a shrinking market, and more higher value "light product" such as gasoline, distillate, jet fuel, and liquefied petroleum gases.

Petroleum Use Increases Mainly in the Transportation Sector

Figure 109. Petroleum consumption by sector, 1970-2020 (million barrels per day)



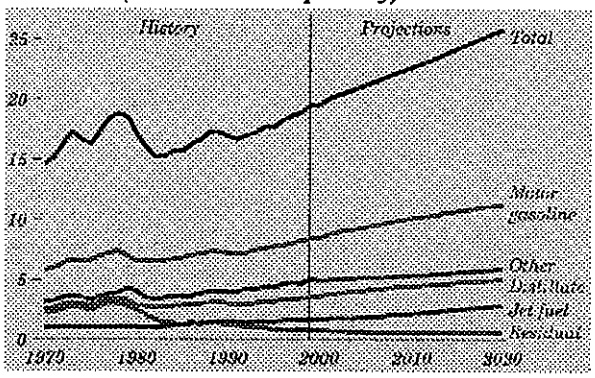
U.S. petroleum consumption is projected to increase by 6.3 million barrels per day between 1999 and 2020. Most of the increase is expected in the transportation sector, which accounted for two-thirds of U.S. petroleum use in 1999 (Figure 109). Petroleum use for transportation is projected to increase by 5.6 million barrels per day in the reference case, 4.3 million in the low economic growth case, and 7.0 million in the high economic growth case.

In the industrial sector, which currently accounts for 26 percent of U.S. petroleum use, consumption in 2020 is projected to be higher than the 1999 level by 1.1 million barrels per day in the reference case, by 0.4 million in the low economic growth case, and by 1.9 million in the high economic growth case. About 84 percent of the growth is expected in the petrochemical, construction, and refining sectors.

In the reference case, petroleum use for heating and for electricity generation is expected to decline as oil loses market share to natural gas. Increased oil use for heating and electricity generation is projected, however, in the low oil price case. Natural gas use for home heating is growing in New England, the last stronghold of heating oil. Compared with 1999, heating oil use is projected to be 150,000 barrels per day lower in 2020 in the high price case and 90,000 barrels per day higher in the low price case. For electricity generation, oil-fired steam plants are being retired in favor of natural gas combined-cycle units. Oil use for electricity generation (excluding cogeneration) is projected to be 320,000 barrels per day lower in 2020 than in 1999 in the high price case and 110,000 barrels per day higher in the low price case.

Light Products Account for Most of the Increase in Demand for Petroleum

Figure 110. Consumption of petroleum products, 1970-2020 (million barrels per day)

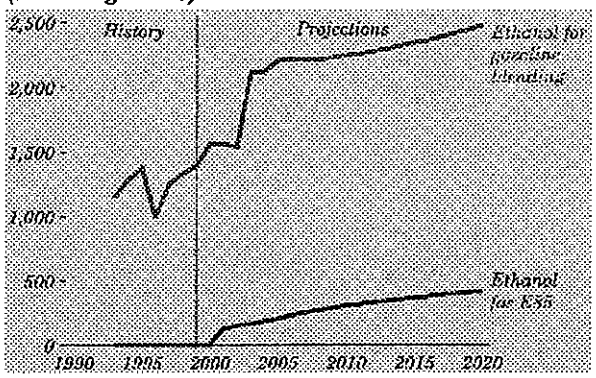


About 96 percent of the projected growth in petroleum consumption stems from increased consumption of "light products," including gasoline, diesel, heating oil, jet fuel, and liquefied petroleum gases, which are more difficult and costly to produce than heavy products (Figure 110). Although refinery investments and enhancements are expected to increase the ability of domestic refineries to produce light products, imports of light products are expected to more than triple by 2020.

In the forecast, gasoline continues to account for almost 45 percent of all the petroleum used in the United States. Between 1999 and 2020, U.S. gasoline consumption is projected to rise from 8.4 million barrels per day to 11.3 million barrels per day. Consumption of distillate fuel is projected to be 1.6 million barrels per day higher in 2020 than it was in 1999, with diesel fuel accounting for 92 percent of the projected increase as demand for freight transportation grows. With air travel also expected to increase, jet fuel consumption is projected to be 1.2 million barrels per day higher in 2020 than in 1999. Consumption of liquefied petroleum gas (LPG), included in "other" petroleum, is projected to increase by about 360,000 barrels per day between 1999 and 2020. Consumption of "other" petroleum products—including petrochemical feedstocks, still gas used to fuel refineries, asphalt and road oil, and other miscellaneous products—is projected to grow by 490,000 barrels per day. Residual fuel use, mainly for electricity generation, is projected to decline from 820,000 barrels per day in 1999 to 600,000 barrels per day in 2020.

State Bans on MTBE Are Expected To Result in Increased Use of Ethanol

Figure 111. U.S. ethanol consumption, 1993-2020 (million gallons)



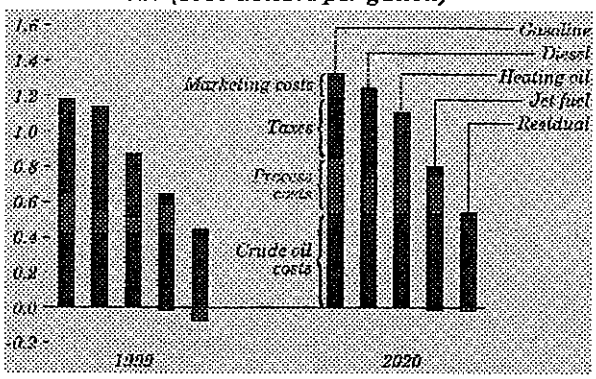
U.S. ethanol production, with corn as the primary feedstock, reached 1.5 billion gallons in 1999. Production is projected to increase to 2.9 billion gallons by 2020, with most of the growth coming from the conversion of cellulosic biomass to ethanol. Ethanol is used primarily in the Midwest as a gasoline volume extender and octane enhancer in a blend of 10 percent ethanol and 90 percent gasoline. It also serves as an oxygenate in areas that are required to use oxygenated fuels (with a minimum 2.7 percent oxygen content by volume) during the winter months to reduce carbon monoxide emissions.

AEO2001 projects an expanded role for ethanol, replacing MTBE as the oxygenate for reformulated gasoline (RFG) in the eight States that have passed legislation limiting the use of MTBE because of concerns about groundwater contamination. The reference case assumes that the Federal requirement for a 2-percent oxygen content in RFG will continue in all States. Ethanol consumption in E85 vehicles is also projected to increase, from the national total of 2.0 million gallons in 1999 to 421 million gallons in 2020 (Figure 111). E85 vehicles are currently in use as government fleet vehicles, flexible-fuel passenger vehicles (which run on either E85 or gasoline), and urban transit buses.

The Federal Highway Bill of 1998 extended the current excise tax exemption for ethanol through 2007 but stipulated reductions from 54 cents per gallon to 53 cents in 2001, 52 cents in 2003, and 51 cents in 2005. *AEO2001* assumes that the exemption will be extended at 51 cents per gallon (nominal) through 2020.

Processing Costs for Most Petroleum Products Rise in the Forecast

Figure 112. Components of refined product costs, 1999 and 2020 (1999 dollars per gallon)

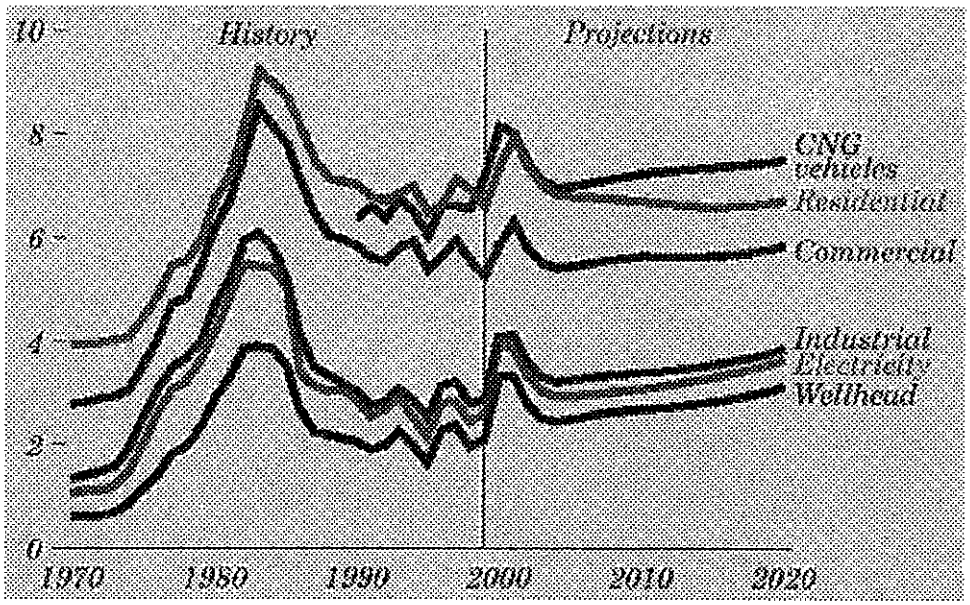


Refined product prices are determined by crude oil costs, refining process costs (including refiner profits), marketing costs, and taxes (Figure 112). In the *AEO2001* projections, crude oil costs are projected to continue making the greatest contribution to product prices and marketing costs are projected to remain stable, but the contributions of processing costs and taxes are expected to change considerably.

The processing costs for light products, including gasoline, diesel fuel, heating oil, and jet fuel, are projected to increase by 6 to 7 cents per gallon between 1999 and 2020. The expected increases are attributed primarily to the projected growth in demand for those products, investment needed to meet new Federal requirements for low-sulfur gasoline between 2004 and 2007, and investments related to compliance with refinery emissions, health, and safety regulations.

Whereas processing costs tend to increase refined product prices in the forecast, assumptions about Federal taxes tend to slow the growth of motor fuels prices. In keeping with the *AEO2001* assumption of current laws and legislation, Federal motor fuels taxes are assumed to remain at nominal 1999 levels throughout the forecast, although Federal taxes have actually been raised sporadically in the past. State motor fuels taxes are assumed to keep up with inflation, as they have in the past. The net impact of the assumptions is an expected decrease in Federal taxes (in 1999 dollars) between 1999 and 2020—7 cents per gallon for gasoline, 9 cents for diesel fuel, and 1 cent for jet fuel.

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



History: Energy Information Administration, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). **Projections:** Table A14.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts				
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AGA	NPC
2015								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	2.88	2.59	3.20	2.64	1.89	2.79	2.56	3.67
Dry gas production[b]	26.24	24.63	27.86	24.48	28.58	24.00	26.71	26.50
Net imports	5.50	5.35	5.62	5.35	4.01	5.70	4.15	4.70
Consumption	31.61	29.85	33.36	30.13	32.78	29.46	30.86	31.84
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5.93	6.07
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3.96	4.09
Industrial[e]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10.72	10.76
Electricity generators[f]	9.30	8.54	9.97	11.63[e]	8.72	9.25[g]	7.06	7.76
Other[h]	2.78	2.63	2.92	2.57	3.27	2.76	3.20	3.16[i]
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6.31[j]	7.65
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.08	5.07[j]	6.76
Industrial[e]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.09[l]	4.86[k]
Electricity generators[f]	3.30	3.05	3.67	3.12[e]	2.55	3.24	2.99[j]	4.21
2020								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	3.18	2.66	3.68	2.72	NA	3.07	NA	NA
Dry gas production[b]	29.04	26.74	30.38	25.72	NA	25.13	NA	NA
Net imports	5.80	5.58	5.82	5.72	NA	6.00	NA	NA
Consumption	34.78	32.22	36.09	31.32	NA	28.58	NA	NA
Residential	6.14	5.95	6.21	5.88	NA	5.84	NA	NA
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	NA	NA
Industrial[e]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	NA	NA
Electricity generators[f]	11.34	10.23	11.39	12.72[e]	NA	9.89[g]	NA	NA
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	NA	NA
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.78	6.32	7.24	7.44	NA	7.25	NA	NA
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	NA	NA
Industrial[e]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	NA	NA
Electricity generators[f]	3.66	3.17	4.17	3.20[e]	NA	3.52	NA	NA

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore, forecast values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,029 Btu per cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: *AEO2001*: AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case), LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). **WEFA:** The WEFA Group, *Natural Gas Outlook* (2000). **GRI:** Gas Research Institute, *GRI Baseline Projection of U.S. Energy Supply and Demand*, 2000 Edition (January 2000). **DRI:** Standard & Poor's DRI, *U.S. Energy Outlook* (Spring/Summer 2000). **AGA:** American Gas Association, *1999 AGA-TERA Base Case* (December 1999). **NPC:** National Petroleum Council, *Natural Gas, Meeting the Challenges of the Nation's Growing Natural Gas Demand* (December 1999).

Table A3. Energy Prices by Sector and Source
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Residential	13.54	13.17	12.93	13.16	13.33	13.59	0.1%
Primary Energy[1]	6.87	6.72	7.12	7.01	6.92	7.01	0.2%
Petroleum Products[2]	7.53	7.55	9.18	9.37	9.49	9.64	1.2%
Distillate Fuel	6.25	6.27	7.33	7.51	7.80	7.98	1.2%
Liquefied Petroleum Gas	10.45	10.36	12.83	13.07	12.83	12.87	1.0%
Natural Gas	6.74	6.52	6.63	6.53	6.44	6.55	0.0%
Electricity	24.24	23.60	21.90	21.88	22.01	22.17	-0.3%
Commercial	13.53	13.25	12.39	11.75	11.96	12.37	-0.3%
Primary Energy[1]	5.26	5.22	5.35	5.53	5.55	5.74	0.5%
Petroleum Products[2]	4.68	5.00	6.01	6.17	6.34	6.50	1.3%
Distillate Fuel	4.01	4.37	5.12	5.28	5.55	5.75	1.3%
Residual Fuel	2.42	2.63	3.64	3.69	3.77	3.85	1.8%
Natural Gas[3]	5.47	5.34	5.31	5.50	5.60	5.71	0.3%
Electricity	22.17	21.54	19.58	17.63	17.72	18.12	-0.8%
Industrial[4]	4.97	5.33	5.49	5.45	5.56	5.85	0.4%
Primary Energy	3.51	3.92	4.25	4.38	4.48	4.72	0.9%
Petroleum Products[2]	4.79	5.65	5.95	6.05	6.10	6.27	0.6%
Distillate Fuel	4.11	4.85	5.29	5.45	5.73	5.94	1.2%
Liquefied Petroleum Gas	7.27	8.50	7.94	8.01	7.75	7.83	-0.4%
Residual Fuel	2.56	2.78	3.36	3.42	3.50	3.58	1.2%
Natural Gas[5]	2.73	2.79	3.17	3.31	3.45	3.76	1.4%
Metallurgical Coal	1.73	1.65	1.59	1.54	1.49	1.44	-0.7%
Steam Coal	1.45	1.43	1.35	1.29	1.25	1.21	-0.8%
Electricity	13.34	13.09	12.34	11.24	11.27	11.62	-0.6%
Transportation	7.70	8.30	9.27	9.46	9.38	9.31	0.5%
Primary Energy	7.68	8.29	9.25	9.45	9.36	9.29	0.5%
Petroleum Products[2]	7.68	8.28	9.25	9.44	9.36	9.29	0.5%
Distillate Fuel[6]	7.66	8.22	8.89	8.94	9.05	8.98	0.4%
Jet Fuel[7]	4.13	4.70	5.25	5.47	5.76	5.88	1.1%
Motor Gasoline[8]	8.74	9.45	10.64	10.93	10.75	10.68	0.8%
Residual Fuel	2.29	2.46	3.10	3.18	3.25	3.33	1.5%
Liquefied Petroleum Gas[9]	11.23	12.87	14.19	14.28	13.98	13.84	0.3%
Natural Gas[10]	6.40	7.02	6.80	7.04	7.17	7.32	0.2%
Ethanol (E85)[11]	14.25	14.42	19.12	19.00	19.24	19.36	1.4%
Methanol (M85)[12]	8.93	10.38	13.12	13.74	14.33	14.43	1.6%
Electricity	15.66	15.57	14.33	13.47	13.21	13.06	-0.8%
Average End-Use Energy	8.26	8.55	8.91	8.95	9.01	9.17	0.3%
Primary Energy	5.89	6.33	7.00	7.16	7.21	7.30	0.7%
Electricity	20.03	19.50	18.15	17.20	17.30	17.59	-0.5%
Electric Generators[13]							
Fossil Fuel Average	1.50	1.49	1.52	1.54	1.68	1.86	1.1%
Petroleum Products	2.32	2.50	3.70	4.11	4.27	4.35	2.7%
Distillate Fuel	3.25	4.05	4.85	4.84	5.10	5.28	1.3%
Residual Fuel	2.22	2.42	3.52	3.86	4.00	4.07	2.5%
Natural Gas	2.41	2.55	2.88	3.03	3.24	3.59	1.6%
Steam Coal	1.27	1.21	1.13	1.05	1.01	0.98	-1.0%

Table A8. Electricity Supply, Disposition, Prices, and Emissions (Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Generation by Fuel Type							
Electric Generators[1]							
Coal	1826	1833	2085	2196	2246	2298	1.1%
Petroleum	115	100	32	17	17	19	-7.7%
Natural Gas[2]	346	371	584	900	1266	1587	7.2%
Nuclear Power	674	730	740	720	639	574	-1.1%
Pumped Storage	-2	-1	-1	-1	-1	-1	N/A
Renewable Sources[3]	359	353	370	390	395	396	0.5%
Total	3317	3386	3810	4222	4563	4872	1.7%
Nonutility Generation for Own Use	16	16	17	16	16	16	-0.0%
Distributed Generation	0	0	1	3	4	5	N/A
Cogenerators[4]							
Coal	52	47	52	52	52	52	0.5%
Petroleum	15	9	10	10	10	10	0.4%
Natural Gas	197	206	239	257	276	299	1.8%
Other Gaseous Fuels[5]	8	4	6	7	7	8	3.3%
Renewable Sources[3]	31	31	34	39	44	48	2.0%
Other[6]	8	5	5	5	5	5	0.3%
Total	310	302	347	370	394	422	1.6%
Other End-Use Generators[7]	6	5	5	5	5	5	0.6%
Sales to Utilities	158	151	171	178	187	200	1.4%
Generation for Own Use	158	156	181	199	213	227	1.8%
Net Imports[8]	27	32	52	29	21	21	-2.0%
Electricity Sales by Sector							
Residential	1128	1146	1318	1455	1573	1701	1.9%
Commercial	1068	1083	1274	1432	1559	1643	2.0%
Industrial	1040	1063	1144	1228	1309	1411	1.4%
Transportation	17	17	26	35	43	49	5.0%
Total	3253	3309	3761	4147	4484	4804	1.8%
End-Use Prices (1999 cents per kilowatthour)[9]							
Residential	8.3	8.1	7.5	7.5	7.5	7.6	-0.3%
Commercial	7.8	7.3	6.7	6.0	6.0	6.2	-0.8%
Industrial	4.6	4.5	4.2	3.8	3.8	4.0	-0.6%
Transportation	5.4	5.3	4.9	4.6	4.5	4.5	-0.8%
All Sectors Average	6.8	6.7	6.2	5.9	5.9	6.0	-0.5%
Prices by Service Category (1999 cents per kilowatthour)[9]							
Generation	4.3	4.1	3.6	3.2	3.2	3.4	-0.9%
Transmission	0.6	0.6	0.8	0.7	0.7	0.7	0.7%
Distribution	2.0	2.0	2.0	2.0	2.0	2.0	-0.0%
Emissions (million short tons)							
Sulfur Dioxide	13.13	12.46	10.30	9.28	9.33	8.95	-1.6%
Nitrogen Oxide	5.83	5.45	4.25	4.22	4.33	4.42	-1.0%

[1]Includes grid-connected generation at all utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.
[2]Includes electricity generation by fuel cells.
[3]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[4]Cogenerators produce electricity and other useful thermal energy. Includes sales to utilities and generation for own use.
[5]Other gaseous fuels include refinery and still gas.
[6]Other includes hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.
[7]Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.
[8]In 1999 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.
[9]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1998: Electric generators and cogenerators generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Electric Power Annual 1998, Volume 2*, DOE/EIA-0348(98)/2 (Washington, DC, December 1999), and supporting databases. Other generators: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility" and Department of Energy, Office of Energy Efficiency and Renewable Energy estimates. Commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 19* (Oak Ridge, TN, 1999 September 1999). Prices: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A. 1999 and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A.

Reference Case Forecast

Table A14. Natural Gas Prices, Margins, and Revenues (1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Source Price							
Average Lower 48 Wellhead Price[1]	2.02	2.08	2.49	2.69	2.83	3.13	2.0%
Average Import Price	1.99	2.29	2.49	2.43	2.47	2.67	0.7%
Average[2]	2.01	2.11	2.49	2.64	2.76	3.05	1.8%
Delivered Prices							
Residential	6.92	6.69	6.81	6.70	6.61	6.73	0.0%
Commercial	5.62	5.49	5.45	5.65	5.65	5.86	0.3%
Industrial[3]	2.80	2.87	3.26	3.40	3.54	3.86	1.4%
Electric Generators[4]	2.48	2.59	2.94	3.08	3.30	3.68	1.6%
Transportation[5]	6.57	7.21	6.99	7.23	7.36	7.52	0.2%
Average[6]	4.13	4.16	4.35	4.38	4.39	4.62	0.5%
Transmission and Distribution Margins[7]							
Residential	4.91	4.58	4.32	4.07	3.85	3.68	-1.0%
Commercial	3.60	3.37	2.96	3.01	2.89	2.81	-0.9%
Industrial[3]	0.79	0.75	0.77	0.76	0.78	0.82	0.4%
Electric Generators[4]	0.44	0.48	0.44	0.45	0.54	0.61	1.2%
Transportation[5]	4.56	5.10	4.50	4.60	4.60	4.48	-0.6%
Average[6]	2.12	2.04	1.88	1.74	1.63	1.57	-1.2%
Transmission and Distribution Revenue (billion 1999 dollars)							
Residential	22.31	21.61	22.96	22.55	22.42	22.58	0.2%
Commercial	10.87	10.36	10.71	11.40	11.38	11.31	0.4%
Industrial[3]	6.60	6.00	6.75	7.12	7.61	8.32	1.6%
Electric Generators[4]	1.63	1.81	2.38	3.11	5.02	6.93	6.6%
Transportation[5]	0.05	0.08	0.25	0.42	0.58	0.69	11.0%
Total	41.45	39.86	43.04	44.59	47.01	49.82	1.1%

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1998 residential, commercial, and transportation delivered prices; average lower 48 wellhead price; and average import price: Energy Information Administration (EIA), *Natural Gas Annual 1998*, DOE/EIA-0131(98) (Washington, DC, October 1999). 1998 electric generators delivered price: Form FERC-423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 1998 and 1999 industrial delivered prices based on EIA, *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1998 values, other 1999 values, and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101800A.

Table B14. Natural Gas Prices, Margins, and Revenue
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	1999	Projections								
		2010			2015			2020		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Source Price										
Average Lower 48 Wellhead Price[1]	2.08	2.49	2.69	3.06	2.59	2.83	3.20	2.66	3.13	3.68
Average Import Price	2.29	2.33	2.43	2.53	2.35	2.47	2.58	2.44	2.67	2.89
Average[2]	2.11	2.46	2.64	2.98	2.54	2.78	3.09	2.62	3.05	3.55
Delivered Prices										
Residential	6.69	6.50	6.70	7.09	6.37	6.61	6.95	6.32	6.73	7.24
Commercial	5.49	5.45	5.65	6.03	5.41	5.65	6.00	5.42	5.86	6.38
Industrial[3]	2.87	3.20	3.40	3.78	3.29	3.54	3.91	3.38	3.86	4.43
Electric Generators[4]	2.59	2.90	3.08	3.45	3.05	3.30	3.67	3.17	3.66	4.17
Transportation[5]	7.21	6.95	7.23	7.74	6.99	7.36	7.84	6.96	7.52	8.17
Average[6]	4.16	4.21	4.38	4.72	4.17	4.39	4.72	4.19	4.62	5.14
Transmission & Distribution Margins[7]										
Residential	4.58	4.05	4.07	4.12	3.83	3.85	3.86	3.70	3.68	3.69
Commercial	3.37	2.99	3.01	3.05	2.86	2.89	2.91	2.80	2.81	2.84
Industrial[3]	0.75	0.74	0.76	0.80	0.74	0.78	0.82	0.78	0.82	0.88
Electric Generators[4]	0.48	0.44	0.45	0.47	0.50	0.54	0.59	0.55	0.61	0.62
Transportation[5]	5.10	4.49	4.60	4.76	4.45	4.60	4.75	4.34	4.48	4.62
Average[6]	2.04	1.75	1.74	1.74	1.63	1.63	1.63	1.57	1.57	1.60
Transmission & Distribution Revenue (billion 1999 dollars)										
Residential	21.61	22.21	22.55	22.88	21.83	22.42	22.78	22.03	22.58	22.93
Commercial	10.36	11.05	11.40	11.72	10.85	11.38	11.84	10.73	11.31	11.88
Industrial[3]	6.00	6.66	7.12	7.88	6.80	7.61	8.66	7.08	8.32	9.86
Electric Generators[4]	1.81	2.87	3.11	3.48	4.29	5.02	5.84	5.67	6.93	7.05
Transportation[5]	0.08	0.39	0.42	0.45	0.53	0.58	0.63	0.62	0.69	0.77
Total	39.86	43.18	44.59	46.40	44.31	47.01	49.76	46.13	49.82	52.49

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.
Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1999 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1999 values and projections: EIA, AEO2001 National Energy Modeling System runs LM2001.D101600A, AEO2001.D101600A, and HM2001.D101600A.

Report Contents

[Report#:DOE/EIA-0383(2001)]
December 22, 2000
(Next Release: December, 2001)

Preface

Overview

Legislation & Regulations

Issues in Focus

Market Trends

Forecast Comparisons

Major Assumptions for the Forecasts

Summary of the AEO2001 Cases/ Scenarios
- Appendix Table G1

Model Results (Formats - PDF, ZIP)
- Appendix Tables
- Reference Case
- 1998 to 2020

Download

Forecast Comparisons

Economic Growth	World Oil Prices	Total Energy Consumption	Residential and Commercial Sectors	Industrial Sector
Transportation Sector	Electricity	Natural Gas	Petroleum	Coal

Three other organizations—Standard & Poor's DRI (DRI), the WEFA Group (WEFA), and the Gas Research Institute (GRI) [95]—also produce comprehensive energy projections with a time horizon similar to that of *AEO2001*. The most recent projections from those organizations (DRI, Spring/Summer 2000; WEFA, 1st Quarter 2000; GRI, January 2000), as well as other forecasts that concentrate on petroleum, natural gas, and international oil markets, are compared here with the *AEO2001* projections.

Economic Growth

Differences in long-run economic forecasts can be traced primarily to different views of the major supply-side determinants of growth in gross domestic product (GDP): labor force and productivity change (Table 19). In comparison with the *AEO2001* and DRI reference cases, the WEFA forecast shows the highest economic growth, including a higher growth rate for the labor force. The *AEO2001* long-run forecast of average annual economic growth from 1999 to 2020 in the reference case is 3.0 percent—0.9 percent higher than the *AEO2000* forecast.

Table 19. Forecasts of economic growth, 1999-2020

The June 26, 2000, mid-session review by the Office of Management and Budget projected real GDP growth of 3.1 percent per year between 1999 and 2010. *AEO2001* projects annual growth of 3.3 percent over the same period.

World Oil Prices

Comparisons with other oil price forecasts—including the International Energy Agency (IEA), Petroleum Economics Ltd. (PEL), Petroleum Industry Research Associates, Inc. (PIRA), Natural Resources Canada (NRCan), and Deutsche Banc Alex. Brown (DBAB)—are shown in Table 20 (IEA, 1998; PEL, February 2000; PIRA, October 2000; NRCan, April 1997; DBAB, June 2000). With the exception of IEA and PEL, the range between the *AEO2001* low and high world oil price cases spans the range of other published forecasts.

Table 20. Forecasts of world oil prices, 2000-2020

Total Energy Consumption

Report
- Entire AEO2001 (PDF)
- AEO2001 by Chapters (PDF)

Acronyms

Contacts

Feedback

Related Links

Assumptions to the AEO2001

Supplemental Data to the AEO2001 (Only available on the Web)
- Regional and more detailed AEO 2001 Reference Case Results
- 1998, 2000 to 2020

NEMS Conference

Forecast Homepage

EIA Homepage

The *AEO2001* forecast of end-use sector energy consumption over the next two decades shows far less volatility than has occurred historically. Between 1974 and 1984, volatile world oil markets dampened domestic oil consumption. Consumers switched to electricity-based technologies in the buildings sector, while in the transportation sector new car fuel efficiency nearly doubled. Natural gas use declined as a result of high prices and limitations on new gas hookups. Between 1984 and 1995, however, both petroleum and natural gas consumption rebounded, bolstered by plentiful supplies and declining real energy prices. As a consequence, new car fuel efficiency in 1995 was less than 2 miles per gallon higher than in 1984, and natural gas use (residential, commercial, and industrial) was almost 25 percent higher than it was in 1984.

Given potentially different assumptions about, for example, technological developments over the next 20 years, the forecasts from DRI, GRI, and WEFA have remarkable similarities with the *AEO2001* projections. Electricity is expected to remain the fastest growing source of delivered energy (Table 21), although its projected rate of growth is down sharply from historical rates in each of the forecasts, because many traditional uses of electricity (such as for air conditioning) approach saturation while average equipment efficiencies rise. Petroleum use and natural gas consumption are projected to grow at rates similar to those of recent years. For other fuels, future growth in consumption is expected to slow as a result of moderating economic growth, fuel switching, and increased end-use efficiency.

Table 21. Forecasts of average annual growth rates for energy consumption (percent)

Residential and Commercial Sectors

Growth rates for energy demand in the residential and commercial sectors are expected to decrease by more than 25 percent from the rates between 1984 and 1998, largely because of projected lower growth in population, housing starts, and commercial floorspace additions. Other contributing factors include increasing energy efficiency due to technical innovations and legislated standards; voluntary government efficiency programs; and reduced opportunities for additional market penetration of such end uses as air conditioning.

Differing views on the growth of new uses for energy contribute to variations among the forecasts. By fuel, electricity (excluding generation and transmission losses) remains the fastest growing energy source for both sectors across all forecasts (Table 22). All the forecasts project substantial growth in electricity use, with the *AEO2001*, DRI, and WEFA projections showing slower growth toward the end of the forecast. Natural gas use also is projected to grow but at lower rates, and projected petroleum use either is stable or continues to fall. GRI projects a more rapid decline in oil use, particularly for commercial space and water heating, than the other forecasts.

Table 22. Forecasts of average annual growth in residential and commercial energy demand (percent)

Industrial Sector

The projected growth rates for delivered energy consumption in the industrial sector range from 1.0 percent to 1.4 percent per year (Table 23). The *AEO2001* forecast is in the middle, at 1.2 percent. Generally, the projected growth rates are somewhat lower than the actual rates from 1984 to 1998. The decline is attributable to lower growth for GDP and manufacturing output. In addition, there has been a continuing shift in the industrial output mix toward less energy-intensive products.

The growth rates for different fuels in the industrial sector between 1984 and 1998 reflect a shift from petroleum products and coal to greater reliance on natural gas and electricity. In all the forecasts, natural gas use is expected to grow more slowly than in recent history, because much of the potential for fuel switching was realized during the 1980s. A key uncertainty in industrial coal forecasts is the environmental acceptability of coal as a boiler fuel.

Table 23. Forecasts of average annual growth in industrial energy demand (percent)

Transportation Sector

Overall fuel consumption in the transportation sector is expected to grow slightly more slowly than in the recent past in each of the forecasts (Table 24). All the forecasts anticipate continued rapid growth in air travel and considerably slower growth in light-duty vehicle travel. Demand for diesel fuel is expected to grow more slowly in all the forecasts than it has in the past.

GRI and WEFA project slower growth in gasoline demand as a result of slower growth in light-duty vehicle travel, and GRI projects more rapid efficiency improvements. GRI also projects the slowest growth in air travel of all the forecasts, leading to slower growth in jet fuel demand. For diesel fuel, however, GRI projects rapid growth in demand comparable to the *AEO2001* forecast, because it projects similar annual growth in freight travel.

Table 24. Forecasts of average annual growth in transportation energy demand (percent)

Electricity

Comparison across forecasts shows slight variation in projected electricity sales (Table 25). Sales projections for 2020 range from 1,485 billion kilowatthours (DRI) to 1,610 billion kilowatthours (WEFA) for the residential sector, as compared with the *AEO2001* reference case value of 1,701 billion kilowatthours. The forecasts for total electricity sales in 2020 range from 4,450 billion kilowatthours (DRI) to 4,503 billion kilowatthours (WEFA), compared with the *AEO2001* reference case value of 4,804 billion kilowatthours. All the projections for total electricity sales in 2020 fall below the range of the *AEO2001* low and high economic growth cases (4,516 and 5,135 billion kilowatthours, respectively). Different assumptions related to expected economic activity, coupled with diversity in the estimation of penetration rates for energy-efficient technologies, are the primary reasons for variation among the forecasts. All the forecasts compared here agree that stable fuel prices and slow growth in electricity demand relative to GDP growth will tend to keep the price of electricity stable—or declining in real terms—until 2020.

Table 25. Comparison of electricity forecasts (billion kilowatthours, except where noted)

Both the DRI and GRI forecasts assume that the electric power industry will be fully restructured, resulting in average electricity prices that approach long-run marginal costs. *AEO2001* also assumes that competitive pressures will grow and continue to push prices down until the later years of the projections. *AEO2001* also assumes that increased competition in the electric power industry will lead to lower operating and maintenance costs, lower general and administrative costs, early retirement of inefficient generating units, and other cost reductions. Further, in the DRI forecast, it is assumed that time-of-use electricity rates will cause some

flattening of electricity demand (lower peak period sales relative to average sales), resulting in better utilization of capacity and capital cost savings.

The distribution of sales among sectors affects the mix of capacity types needed to satisfy sectoral demand. Although the *AEO2001* mix of capacity among fuels is similar to those in the other forecasts, small differences in sectoral demands across the forecasts could lead to significant differences in the expected mix of capacity types. In general, recent growth in the residential sector, coupled with an oversupply of baseload capacity, results in a need for more peaking and intermediate capacity than baseload capacity. Consequently, generators are expected to plan for more combustion turbine and combined-cycle technology than coal, oil, or gas steam capacity.

Natural Gas

The differences among published forecasts of natural gas prices, production, consumption, and imports (Table 26) indicate the uncertainty of future market trends. Because the forecasts depend heavily on the underlying assumptions that shape them, the assumptions should be considered when different projections are compared. For instance, the forecast from GRI incorporates a cyclical price trend based on exploration and production cycles, which can be deceptive when isolated years are considered. In both 2015 and 2020, the forecast with the highest natural gas consumption is the *AEO2001* high economic growth forecast (33.36 and 36.09 trillion cubic feet, respectively); and the forecast with the lowest level is the DRI forecast (29.46 and 28.58 trillion cubic feet, respectively).

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

The National Petroleum Council (NPC) forecast shows the greatest expected growth in natural gas consumption between 1999 and 2015 in the residential and commercial sectors. The DRI forecast shows the lowest growth between 1999 and 2015 and also between 1999 and 2020. For residential consumption in 2015, the expected percentage increase over 1999 is 10 percentage points higher in the NPC forecast than in the DRI forecast; for commercial consumption the difference is 23 percentage points. The DRI forecast for commercial consumption is significantly lower than the other forecasts, due in part to definitional differences, and is even lower for 2020 than for 2015. Both the *AEO2001* reference and high economic growth forecasts for residential and commercial consumption exceed the other forecasts for 2020.

For industrial sector consumption of natural gas, the WEFA and DRI forecasts are not strictly comparable with the others because of differences in definitions. Among the remaining forecasts, the *AEO2001* reference, low economic growth, and high economic growth cases all project lower consumption in 2015 than do the GRI, AGA, and NPC reference cases. All the forecasts project the strongest growth in natural gas consumption for the electricity generation sector.

Domestic natural gas consumption is met by domestic production and imports. DRI projects the highest level of net imports, as well as the highest share of imports relative to total supply, in both 2015 and 2020. GRI's projection for 2015 is 1.7 trillion cubic feet lower than DRI's, corresponding to projected import shares of total supply at 12 percent and 19 percent, respectively. The forecasts available for 2020 are much more closely aligned. In general the projections for domestic production levels among the forecasts correspond to their projections for domestic consumption. GRI projects the highest production level in 2015, as well as relatively low import levels.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts			
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AG
2015							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**2.83**	**2.59**	**3.20**	**2.64**	**1.89**	**2.79**	**2**
Dry gas production[b]	**26.24**	**24.63**	**27.86**	**24.43**	**28.58**	**24.00**	**26**
Net imports	**5.50**	**5.35**	**5.62**	**5.35**	**4.01**	**5.70**	**4**
Consumption	**31.61**	**29.85**	**33.36**	**30.13**	**32.78**	**29.46**	**30**
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3
Industrial[c]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10
Electricity generators[f]	9.30	8.54	9.97	11.63[c]	8.72	9.25[g]	7
Other[h]	2.78	2.63	2.92	2.57	3.27	2.75	3
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.03	5
Industrial[c]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.(
Electricity generators[f]	3.30	3.05	3.67	3.12[c]	2.55	3.24	2
2020							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**3.13**	**2.66**	**3.68**	**2.72**	**NA**	**3.07**	
Dry gas production[b]	**29.04**	**26.74**	**30.38**	**25.72**	**NA**	**25.13**	
Net imports	**5.80**	**5.58**	**5.82**	**5.72**	**NA**	**6.00**	
Consumption	**34.73**	**32.22**	**36.09**	**31.82**	**NA**	**28.58**	
Residential	6.14	5.95	6.21	5.88	NA	5.84	
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	
Industrial[c]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	
Electricity generators[f]	11.34	10.23	11.29	12.72[c]	NA	9.89[g]	
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.73	6.32	7.24	7.44	NA	7.25	
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	
Industrial[c]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	
Electricity generators[f]	3.66	3.17	4.17	3.20[c]	NA	3.52	

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.
Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,(cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.
Sources: **AEO2001:** AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). **WEFA:** Group, Natural Gas Outlook (2000). **GRI:** Gas Research Institute, GRI Baseline Projection of U.S. Energy Supp Demand, 2000 Edition (January 2000). **DRI:** Standard & Poor's DRI, U.S. Energy Outlook (Spring/Summer 200 American Gas Association, 1999 AGA-TERA Base Case (December 1999). **NPC:** National Petroleum Council, Meeting the Challenges of the Nation's Growing Natural Gas Demand (December 1999).

Back to Forecast Comparisons

Even with production levels closer to the mid-range, the NPC forecast projects the highest wellhead price in 2015. At the other extreme, GRI projects the lowest wellhead price and the highest production levels. By 2020 the wellhead price forecasts from WEFA and DRI fall within the range of the *AEO2001* low and high economic growth cases, but both the WEFA and DRI forecasts for domestic production are lower than that in the *AEO2001* low economic growth case. With one exception, all the forecasts for end-use prices follow the same ranking from highest to lowest as do the wellhead price forecasts for both 2015 and 2020.

For the residential and commercial sectors in 2015, WEFA projects the highest end-use margins relative to the wellhead. The lowest projections for residential (GRI) and commercial (AGA) margins are $1.10 and $1.02 per thousand cubic feet lower than WEFA's, respectively, a noticeable difference. The GRI forecast, projecting relatively low residential and commercial margins, projects the highest margin to electricity generators in 2015, at $0.23 above the lowest (AGA). AGA generally projects the lowest margins, but they do not include some State and local taxes. Because of definitional differences industrial prices are not as readily comparable, although on-system sale prices would generally be expected to be higher than an estimate of the average price to all industrial customers. With the exception of the *AEO2001* high economic growth case, margins to the industrial sector are expected to decline through 2015 in all the forecasts. The *AEO2001* and NPC forecasts project declines of less than 10 percent in the industrial margin from 1998 to 2015, whereas the projected decline in the GRI and AGA forecasts is over 20 percent.

Petroleum

Projected prices for crude oil in the *AEO2001* low and high oil price cases (Table 27) bound the 2010 and 2020 projections in five other petroleum forecasts: the *AEO2001* reference case, WEFA, GRI, DRI, and the Independent Petroleum Association of America (IPAA). Comparisons with GRI and IPAA forecasts, which do not extend to 2020, apply only to 2010. *AEO2001* shows the highest reference case price path of the five forecasts. The *AEO2001* reference case projection for the world oil price in 2010 is $2.89 per barrel above the WEFA projection, $3.20 above GRI, and $2.72 above DRI. In 2020, however, the *AEO2001* reference case projection is only $2.00 per barrel above the WEFA projection and $1.25 above the DRI projection.

Table 27. Comparison of petroleum forecasts (million barrels per day, except where noted)

Crude oil price forecasts are influenced by differing views of the projected composition of world oil production, such as the expansion of OPEC oil production and the timing of an expected recovery in East Europe/former Soviet Union oil production. Differences may also arise on the basis of different views of the strength of the U.S. economy and the timing and strength of economic recovery in southeast Asia.

All the forecasts except GRI project a significant decline in domestic oil production between 2000 and 2010, reflecting assumed declines in proved reserves. GRI projects a milder decline before 2005, followed by an upturn in production between 2005 and 2015. Both WEFA and DRI continue their downward production projections to 2020, at slower rates. *AEO2001* projects a sharper decline before 2010 than do the other four projections, resulting in a 2010 reference case projection for crude oil production that is at least 280,000 barrels per day below the other reference case forecasts.

The *AEO2001* reference case projects relatively little change in annual domestic oil production between 2010 and 2020, whereas the high world oil price case projects a slight recovery after 2010, leading to more production in 2020 than in 2010. As a result, projected production in 2020 in the *AEO2001* high oil price case is above the WEFA and DRI projections, whereas the *AEO2001* reference case projection is essentially the same as the WEFA projection. The *AEO2001* projections for production of natural gas liquids are within the range of the other forecasts. GRI projects the highest level of natural gas liquids production in 2010 at 2.69 million barrels per day and IPAA the lowest at 2.03 million barrels per day.

The three *AEO2001* cases, along with DRI and IPAA, project relatively high levels of petroleum consumption, mostly as a result of higher projections for gasoline consumption. WEFA and GRI project the lowest petroleum consumption in 2010 at around 21.5 million barrels per day. DRI projects the highest consumption in 2010, followed by IPAA, the *AEO2001* low oil price case, and the *AEO2001* reference case. DRI has the highest 2020 consumption projection, followed closely by the *AEO2001* low oil price case. The WEFA consumption projection is significantly lower than all other forecasts for 2020, mainly because WEFA expects lower consumption of transportation fuels. Despite a wide range of oil price assumptions, the three *AEO2001* cases show limited variation in their projections for gasoline consumption. The three *AEO2001* cases show significantly more distillate fuel consumption than do WEFA and DRI, mainly attributable to a higher projected rate of increase in freight travel.

The projections of net petroleum imports in the *AEO2001* low oil price case are well above those in the other forecasts, reflecting low production and high consumption projections. The projected percentage of petroleum consumption from imports, which is an indicator of the relative direction of production, net imports, and consumption, is also highest in the *AEO2001* low oil price case, followed by the DRI forecast. For 2010 the projected import share of consumption ranges from 52 percent (WEFA and IPAA) to 66 percent (*AEO2001* low oil price case). In 2020 all the forecasts show increased reliance on imports, with the highest projection being 70 percent in the *AEO2001* low oil price case. WEFA projects the lowest share of imports in 2020 at 56 percent, because it projects significantly lower petroleum consumption than in the other forecasts. WEFA actually projects lower import shares than were projected in its own forecast last year for both 2010 and 2020 and is the only forecast with lower projected import shares than last year.

Coal

The coal forecast by DRI is the most similar to the *AEO2001* coal forecasts; however, the coal forecasts by DRI, WEFA and GRI/Hill [96] all project lower production and overall consumption than does *AEO2001* (Table 28). The differences stem from differences in assumptions related to expected economic activity and sectoral growth in electricity demand and whether the forecast includes the effects of emissions limits proposed by the U.S. Environmental Protection Agency, which could force the retirement of many older coal plants. *AEO2001* represents the provisions of the State implementation plan (SIP) call for 19 States where NO_x caps were finalized but does not incorporate revised limits on emissions of particulate matter. The DRI forecast projects substantial gains in efficiency for coal-fired generators.

Table 28. Comparison of coal forecasts (million short tons, except where noted)

EIA projects growing domestic consumption over the forecast horizon in

combination with shrinking real coal prices. DRI expects some expansion of electricity and industrial sector coal consumption followed by declines beginning after 2010. Similarly, GRI/Hill predicts increases in coal consumption until 2013 followed by a decline. WEFA is the most pessimistic about coal consumption in the electricity generation and industrial sectors.

The differences among the forecasts for coal exports are significant. U.S. coal exports declined from 90 million tons in 1996 to 58 million tons in 1999, and net coal exports in 1999 (after adjustment for imports) were 49 million tons. EIA expects net exports to decline to 35 million tons in 2015 and remain approximately at that level through 2020. GRI/Hill projects an even more dramatic decline in net exports to 4 million tons in 2015 and 2 million tons in 2020, reflecting declining coal demands by importing countries and strong competition from other producers such as Australia, South Africa, and Colombia. The projections for a long-term decline in exports are based primarily on the inability of the U.S. mining industry to keep pace with strong price competition by other exporters and the loss of markets as Europe moves away from coal for environmental reasons. Both DRI and WEFA, however, project relative stability in U.S. net coal exports, at 57 million tons in 2015 and 55 million tons in 2020 (DRI) and 51 million tons in 2015 and 52 million tons in 2020 (WEFA).

The *AEO2001* and WEFA price forecasts for national average minemouth coal prices (all shown in 1999 dollars) are fairly close. The GRI/Hill minemouth price projections are somewhat lower than the other forecasts because they exclude exported and metallurgical coal in the calculation. (Exported and metallurgical coal tend to be more expensive.) In dollars per million Btu, WEFA's slightly lower projected prices at $0.62 in 2015 and $0.59 in 2020 indicate a slightly higher average Btu per ton conversion factor, which in turn indicates a higher proportion of bituminous (over subbituminous) coal in the WEFA forecast.

The coal forecasts reviewed provide a broad range of views, reflecting the great uncertainties facing the U.S. coal industry as it must simultaneously adapt to the financial pressures arising from increasing environmental restrictions on coal use (both here and in Europe), deregulation of the U.S. electricity generation industry, and increasing competition from the younger coal fields of international competitors. The uncertainties are, and will continue to be, passed on to U.S. coal producers in the form of demands for higher quality products at ever lower prices.

If you would like to received any information relating to any of our reports via e-mail, click on the link labeled "Projections ListServ" to Join by entering your e-mail address.

Page last modified on 06/29/2001 08:44:12

URL: http://www.eia.doe.gov/oiaf/aeo/forecast.html

Need Help Now?

Call the National Energy Information Center (NEIC)

(202) 586-8800 9AM - 5PM eastern time

Specialized Services from NEIC

If you are having technical problems with this site, please contact the EIA Webmaster at wmaster@eia.doe.gov

---

This document contains the following shortcuts:

3400.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3400.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	33250 LB	0	0	33,250	0	0	33,250	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	10000 LB	0	0	15,000	0	0	15,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	84,820	2,500	0	87,320	7276.67

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45. DISPOSALS								
3400.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3400.45.10. CARBON (GAC, VAPOR PHASE)								
Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	10000 LBS	0	0	0	5,200	0	5,200	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	5,200	0	5,200	433.33
3400.45.15. CARBON (GAC, LIQUID PHASE)								
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	33250 LBS	0	0	0	15,295	0	15,295	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	15,295	0	15,295	1274.58
3400.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81
3400.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	250	2,500	0	12,350	1029.17
TOTAL DISPOSALS	12.00 MO	0	12,600	250	220,709	0	233,559	19463.23

John Spear
10/26/01 12:08 PM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Calculation of T&D costs

Harry, I think I copied you on the quote from Clean Harbors. If not let me know. This is a dressed up version of my calculations.

Jack

T&D calculations.xls

McCORMICK & BAXTER

10/25/01

CALCULATIONS OF T&D COSTS BASED ON QUOTE FROM CLEAN HARBORS
USED IN THE CD ESTIMATES

CARBON (GAC) DISPOSAL COSTS	QUOTED UNIT COSTS	VAPOR PH	LIQUID PHASE
Disposal (per pound)		0.350	0.290
Transportation			
Cost per load	4,435.00		
(say 30,000#/load			
Cost per pound		0.148	0.148
RO/RO Rental			
(say 30 days/load)	270.00		
Cost per pound		0.009	0.009
Liner	50.00		
Cost per pound		0.002	0.002
Haz Fee	1.92/ton	0.001	0.001
TOTALS		0.509	0.450
	Say for est.	0.520 per #	0.460

NAPL DISPOSAL COSTS			
Disposal 0.12/# at 8.5#/gal		1.020	
Transportation			
Cost per load	4,620.00		
(5000 gal/load			
Cost per gallon		0.924	
Loading/Unloading Demurrage			
Say 2 hours extra/loac	170.00	0.034	
TOTALS		1.978	
	Say for est.	1.980 per gal	

John Spear
10/25/01 10:11 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Clean Harbors T&D Quote

Harry,
Here is the quote from Clean Harbors for your backup.
Jack
—— Forwarded by John Spear/Cranford/URSCorp on 10/25/2001 01:17 PM ——

rowlandd@cleanharbors.com (Rowland, Dave)
10/24/2001 06:14 PM

To: '"john_spear@urscorp.com"' <john_spear@urscorp.com>
cc:
Subject: Stockton project

John;

I hope this helps. Call me with any questions

<<URS- CA NJ.doc>>

Dave Rowland
Clean Harbors Environmental Services
800-462-4678 Ext 228

URS- CA NJ.doc

July 3, 2001

URS Corporation
12 Commerce Drive
Cranford, NJ 07016
Attn. Jack Spear

Re: Budgetary numbers- Creosote Liquids

Dear Jack

Thank you for the opportunity to provide this budgetary estimate for the transportation and disposal of Creosote contaminated liquids coming from your California site. Although this project is merely in the planning stages, the cost estimates below should assist in your planning efforts.

Similar to wastes generated at other remediation sites, Clean Harbors (CHES) is familiar with ceosote contamination and we are looking forward to further discussions pertinent to this project. As you move forward, please don't hesitate to contact me with any questions you may have.

As mentioned, Creosote contaminated waste is suitable for incineration at our RCRA/CERCLA approved incinerator in Kimball, NE. Because of its relative proximity to the site, and our ability to receive both liquids and solids via rail, Kimball offers significant advantages over other disposal sites.

In the past two years, our Kimball, NE fluidized- bed incinerator has undergone several improvements that have led to record breaking incineration levels. Since our initial purchase of the incinerator in 1995, CHES has enhanced the feed and processing capabilities, added shredders and permitted pad storage space, replaced refractory linings and has recently completed construction of our second of six permitted monofills. These improvements will enable CHES to continue to incinerate wastes well into the millenium.

The inherent design of a fluidized bed incinerator enables CHES to offer aggressive pricing to customers requiring incineration of bulk solids, sludges and liquids. Additionally, Kimball is the <u>only</u> incinerator in the United States that is capable of delisting the ash produced from the incineration process, virtually eliminating long-term liability associated with hazardous waste landfills.

Attached you will find transportation and disposal pricing based upon the general knowledge of contaminated material from previous projects.

Our fleet of transportation equipment, coupled with our selected subcontracted transportation companies enables Clean Harbors to transport a variety of hazardous wastes without offloading demurrage, often reducing demurrage costs with a streamlined coordination effort. For this project we can utilize 5,000 gallon vacuum trailers from our Kimball site or Thousand Oaks, CA location. Further, we may utilize local approved subcontractors for proper transportation of your waste.

As you move forward with the planning of this project please contact us with any planning or logistical questions you may have. We are eager to work with you and will be contacting you soon to follow up on this quotation. If you have any questions in the meantime, please contact us at the Denver office at 1-800-462-4678 Ext, 228.

Sincerely,

Dave Rowland

Senior Account Manager

URS Corporation **July 3, 2001**

I. DISPOSAL:

a. Creosote contaminated Liquids **$0.08-$0.16/lb/lb.**
Minimum charge applies per load

General Specifications

FB1K BULK LIQUID/ENERGETIC FOR KIMBALL
BTU 6,000 - 10,000/lb
Metals within normal feed rates
Halogen less than 5%
Sulfur less than 3%
No pesticides/level A requirements
Na/K/Mg/P each less than .5%
Ash less than 5%
Settleable solids less than 5%
Viscosity of #4 fuel oil or better
PRIMARY DISPOSAL METHOD: DESTRUCTION INCINERATION

b. Creosote Contaminated Carbon- Vapor Phase
$0.34- $0.36/lb-
Bulk Quantity

c. Creosote Contaminated Carbon- Liquid Phase
$0.26 - $0.32/lb
Bulk Quantity

General Specifications

FB5 SOLID FUEL NOT PROCESSABLE (DEBRIS)
Less than 10% metal pieces
All metal pieces less than 6 inches longest dimension
No metal fines
Less than 30% inorganic material
Less than 10% halogens
Less than 50 ppm PCB's, non-TSCA regulated
Less than 4% sulfur
Greater than 5000 BTU's/lb
No pesticides
Non-dispersible solids (e.g. cured resins, rags, filters)
PRIMARY DISPOSAL METHOD: FUELS BLENDING

II. TRANSPORTATION

From Stockton to Kimball

a.	**Liquids to Kimball**	$4,620.00 per load Loading time: 2hrs $85.00/hr thereafter
b.	**Rolloffs to Kimball**	$4,435.00/load
c.	**Spot Fee**	TBD
d.	**Roll-off Rental**	$9.00/Day
e.	**Roll-off Liner**	$50.00/each

NOTE- scheduling of roll-off wastes into Kimball is most efficient when performed in a drop and swap mode. CHES will provide an empty roll-off to each driver upon delivery of full box.

III. State Hazardous Fee: NE- $1.92/Ton

IV. Analysis:

Basic Waste Approval fee	$75.00- WAIVED UPON FIRST SHIPMENT (Specific analysis, if needed will be additional)

The aforementioned prices are based upon the following conditions & assumptions:

1. Estimate prices only for budgetary needs
2. This project will commence upon agreement of Terms and conditions and a purchase order.
3. CHES will negotiate a mutually agreeable delivery schedule upon award.
4. Materials subject to additional charges if they do not conform to the listed specifications.
5. All containers must be marked with a CHES profile number
6. Client will provide free and clear access to work area for equipment and manpower.
7. Due to recent escalating fuel costs, a temporary 3% OPEC fuel surcharge will be added to each invoice.

We are very proud of our excellent compliance record. When outside disposal services are necessary, CHES only ships to facilities that pass our annual compliance audit, in addition to any disposal restrictions the generator may have. Our fleet of trucks is inspected daily to assure you of safe and dependable transportation of your hazardous waste. In addition, each truck is fitted with a satellite tracking system that enables constant communication with our dispatch personnel.

Finally, we offer waste tracking for all of your wastes through our on-line tracking system. This service is offered on a monthly, quarterly or yearly basis or is available on our Web site at www.Clean Harbors.com. Pricing is firm for 30 days and terms are NET15 commencing the last day of work being performed at the job site listed on the invoice.

Should you have any questions or need additional information, please contact me at 1-800-462-4678 in our Denver Service Center. We sincerely appreciate this opportunity to quote on your waste disposal services.

Metals Feed Limits- ppm

Antimony (Sb)	**1,155**
Arsenic (As)	**75**
Barium (Ba)	**4,050**
Beryllium (Be)	**10**
Cadmium (Cd)	**100**
Chromium (Cr)	**1,000**
Lead (Pb)	**7,995**
Mercury (Hg)	**10.0**
Nickel (Ni)	**12,450**
Selenium (Se)	**255**
Silver (Ag)	**255**
Thallium (Tl)	**37.5**

NOTE:
Wastes must not qualify as Inorganic Metal Bearing Wastes, which EPA prohibits from incineration

Table 7-1
Estimates of GAC Consumption by Liquid Stream Treatment

Visalia data used for scaling				
Liquid pumping rate	400	gpm		
First 6 months average	23,333	lbs/month		
Second year average	16,667	lbs/month		
Third year average	8,333	lbs/month		
Pump-and treat usage	1,667	lbs/month		
McCormick-Baxter estimates	Scenario 1	Scenario 2	Scenario 3	
Pumping rate	475	575	700	gpm
Montly usage 1st yr	27,708	33,542	40,833	lbs/month
Montly usage 2nd yr	23,750	28,750	35,000	lbs/month
Montly usage 3rd yr	14,844	17,969	21,875	lbs/month
Montly usage 4th yr	9,896	11,979	14,583	lbs/month
Usage during cooldown yr 1	5,938	7,188	8,750	lbs/month
Usage during cooldown yr 2	3,958	4,792	5,833	lbs/month
Usage during cooldown yr 3	1,979	2,396	2,917	lbs/month
Estimated total, sacrificial	1,056,875	1,279,375	1,557,500	lbs
Changeout frequency, 10,000 lb primary vessels (times per year)				
Year 1	33	40	49	times
Year 2	29	35	42	times
Year 3	18	22	26	times
Year 4	12	14	18	times
Year 5	7	9	11	times
Year 6	5	6	7	times
Year 7	2	3	4	times
Estimated regeneration frequency (times per month)[1]				
Year 1	6	7	8	times
Year 2	5	6	7	times
Year 3	3	4	4	times
Year 4	2	2	3	times
Year 5	1.2	1.4	1.8	times
Year 6	0.8	1.0	1.2	times
Year 7	0.4	0.5	0.6	times
Estimated carbon usage using regeneration on-site[2]				
Year 1	33,250	40,250	49,000	lbs
Year 2	28,500	34,500	42,000	lbs
Year 3	17,813	21,563	26,250	lbs
Year 4	11,875	14,375	17,500	lbs
Year 5	7,125	8,625	10,500	lbs
Year 6	4,750	5,750	7,000	lbs
Year 7	2,375	2,875	3,500	lbs
Estimated total, regeneration on-site	105,688	127,938	155,750	lbs
1) Assumed that the vessels are regenerated when they are 50% loaded				
2) The carbon will be replaced after 20 regeneration cycles				

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.49. SAMPLING & ANALYSIS								
3400.49. 5. PERFORMANCE MONITORING								
3400.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3400.49.10. COMPLIANCE MONITORING								
3400.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00

3400.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCP (air)			0.00	0.00	0.00	200.00	0.00	200.00	
	40.00	EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)			0.00	0.00	0.00	35.00	0.00	35.00	
	40.00	EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)			0.00	0.00	0.00	60.00	0.00	60.00	
	40.00	EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00	MO	0	25,000	6,300	20,600	0	51,900	4325.00
3400.49.10.10. PERIMETER MONITORING WELLS									
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00	EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00	EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	55.00	EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290			0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00	EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00	EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00	EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00	MO	0	0	2,953	70,675	0	73,628	6135.63
3400.49.10.15. WASTE DISPOSAL CHARACTERIZATION									
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00	EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00	EA	0	0	0	1,125	0	1,125	225.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3400.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3400.49.10.25. SAMPLING TECHNICIANS

3400.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3400.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50

3400.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91

Kathryn Carpenter
06/29/01 07:57 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP, Wendy LS Oresik/Seattle/URSCorp@URSCORP, John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: M&B CD Compliance Monitoring analytical unit costs

Good Morning,

Here is a spreadsheet with unit costs for soil/solid, NAPL, GW, and air/vapor samples. Let me know if I missed anything or you need more backup. One thing we need to figure out is how to monitor for ozone. Can this be done with an onsite monitor? The AirToxics lab does not do this test so I suspect it needs to be done in the field.

compliance monitoring analysis unit cost

Kathryn A. Carpenter, MS
Senior Environmental Chemist
URS Corporation
1501 4th Ave., Suite 1400
Seattle, WA 98101-1616
(206) 438-2053 (phone)
(206) 438-2699 (fax)

Analyte	Method	NAPL	Soil/Solids	GW	Air/Vapor
TOC	9060			$55	
TPH	TPH-Dx	$87	$70	$60	
PAHs *	8310	$203	$161	$140	$220
PCP *	8270 mod	$225	$180	$155	$200
Metals (As, Cu, Cr, Zn)	6000/7000		$45	$40	
TCLP (metals, VOC, SVOC)	TCLP		$740		
Dioxin/Furans	8290			$950	
Natural Attenuation Parameters (dissolved methane, ethane, ethene)	RSK 175			$75	
TO13 (SVOC compounds)	TO13				$275
Carbon dioxide	ASTM D-1946				$115
Carbon monoxide	ASTM D-1946				incl.
Sulfur oxides	ASTM D-1946				$150
NO2	ASTM D-1946				incl.
O3	TBD				TBD
VOC	ASTM D-1946				$220
PM10	PM10				$35

References:
Unit costs for NAPL, soil/solids, and GW from URS Cost Estimating Database (June 2001)
Unit costs for air/vapor from AirToxics
* PCP and PAHs for air/vapor included in TO13 - this price is for reporting PCP or PAHs only

Table 6-1
Overview of Sampling Frequency for Subsurface ERT and Temperature Monitoring

	General Site Coverage		Vertical Plane South of Slough		Horizontal Plane under Slough	New P&T Extraction Wells	New P&T Monitoring Wells
Phase	**ERT**	**DTS**	**ERT**	**DTS**	**ERT**	**DTS**	**DTS**
Heat-up	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily
Flushing/cycling	Monthly	Weekly	Monthly	Weekly	Daily	Weekly	Weekly
Cool-down	Quarterly	Monthly	Quarterly	Monthly	Weekly	Monthly	Monthly
Long-term monitoring	NA	NA	NA	NA	NA	NA	Quarterly

Table 6-2
National Ambient Air Quality Standards

Constituent	Standard Value ($\mu g/m^3$)	Standard Type
CO		
1- Hour average	40 mg/m^3	Primary
8-Hour average	10 mg/m^3	Primary
NO_2		
Annual arithmetic mean	100	Primary and secondary
O_3		
1-Hour average	235	Primary and secondary
8-Hour average	157	Primary and secondary
Pb		
Quarterly average	1.5	Primary and secondary
PM_{10}		
Annual arithmetic mean	50	Primary and secondary
24-Hour average	150	Primary and secondary
SO_2		
Annual arithmetic mean	80	Primary
24-Hour average	365	Primary and secondary
3-Hour average	1,300	Primary and secondary

Note: Units in microgram per cubic meter of air, unless otherwise noted.

Table 6-3
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring—Steam Phase					
ERT data	Subsurface	Temperature	Daily/weekly/ monthly (see Table 6-1)	41 to 63 vertical 4 horizontal	NA
Electrical	System	Amps and power	Weekly	59 ERH electrodes	NA
Temperature/DTS distribution	Wellhead	Temperature	Daily/weekly (see Table 6-1)	301 to 416 wells	NA
Steam distribution	Wellhead	Liquid flow	Continuous	169 to 249	NA
	Wellhead, boiler plant, treatment plant	Pressure	Continuous	200 to 300	NA
Contaminant removal rate	NAPL (at wellhead)	Volume	Weekly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Weekly	4 to 6	NA
		TOC	Weekly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Well installation soil borings[b]	Soil	Visual	Initial	20	20
		TPH	Confirmation	20	20
		PAHs	Confirmation	20	20
		PCP	Confirmation	20	20
Interim drill-back soil borings	Soil	TPH	Annual[c]	50[d]	50[d]
		PAHs	Annual[c]	50[d]	50[d]
		PCP	Annual[c]	50[d]	50[d]
Groundwater monitoring[b]	Water	TOC	Initial	60	60
		PAHs	Initial	60	60
		PCP	Initial	60	60
		Metals[e]	Initial	60	60
		Dioxins/furans	Initial	10	10
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Cool Down Phase					
Temperature/DTS distribution	Subsurface	Temperature	Monthly (see Table 6-1)	301 to 416 wells	NA
Contaminant removal rate	NAPL (at well-head)	Volume	Monthly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Monthly	4 to 6	NA
		TOC	Monthly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring – Cool Down Phase (Continued)					
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Compliance Monitoring – Steam Phase					
Boiler air emissions/ stack monitoring	Gas	VOCs	Initial	1	4[f]
		SVOCs[g]	Initial	1	4[f]
		Dioxins/furans	Initial	1	4[f]
		Metals[h]	Initial	1	4[f]
		PM	Initial	1	4[f]
		HCl	Initial	1	4[f]
		Cl_2	Initial	1	4[f]
		Total hydrocarbons	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
		Opacity	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Monthly	3	36
		PCP	Monthly	3	36
		PM_{10}	Monthly	3	36
		Metals	Monthly	3	36
		CO	CEMS	3	NA
		SO_x	CEMS	3	NA
		NO_2	CEMS	3	NA
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Quarterly	1	4
		PAHs	Quarterly	1	4
		PCP	Quarterly	1	4
		Metals[e]	Quarterly	1	4
		Dioxins/furans	Quarterly	1	4
	Solids (well)	TCLP[i]	Quarterly	1	4
	Solids (SAC)	TCLP[i]	Quarterly	1	4
	Solids (sludge)	TCLP[i]	Quarterly	1	4
	Solids (spent filter media)	TCLP[i]	Quarterly	1	4
Perimeter groundwater monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[d]
Shut-Down Phase					
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Annually	1	1
		PAHs	Annually	1	1
		PCP	Annually	1	1
		Metals[e]	Annually	1	1
		Dioxins/furans	Annually	1	1
	Solids (well)	TCLP[i]	Annually	1	1
	Solids (SAC)	TCLP[i]	Annually	1	1
	Solids (sludge)	TCLP[i]	Annually	1	1
	Solids (spent filter media)	TCLP[i]	Annually	1	1
Perimeter groundwater monitoring	Water	TPH	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Confirmational Sampling					
Soil borings	Soil	LIF survey	Final	4 weeks	4 weeks
		NAPL mobility leach test[j]	Final	10	10
		TPH	Final	10	10
		PAHs	Final	10	10
		PCP	Final	10	10
Long-Term Monitoring (30 years)					
Groundwater monitoring (perimeter and treatment zones)	Water	PAHs	Annually	25	25
		PCP	Annually	25	25

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

[a]Total number of samples does not include QA samples. QA samples are 10% per batch.
[b]Includes baseline sampling and analysis during system (e.g., wells) installation.
[c]Will be conducted for years 2, 3, and 4 (i.e., 3 times over the course of the steam treatment period).
[d]Assumes 5 samples from each of 10 borings.
[e]Metals include As, Cr, Cu, and Zn.
[f]Includes 3 samples taken from 1 boiler stack and 1 blank.
[g]SVOCs include PAHs and PCP.
[h]40 CFR 266.106 provides standards to control metals emissions. Subpart I regulated metals include Ag, As, Ba, Be, Cd, Cr, Hg, Pb, Sb, and Th. Of these metals, As and Cr are of concern at the site.
[i]Leachate from TCLP analyzed for As, Cr, and SVOCs
[j]NAPL Mobility Product Leaching Study, methodology leach test to be determined.

Notes:
Performance monitoring: Monitor system performance during remediation. Includes steam phase and cool-down period.
Compliance monitoring: Monitor compliance with disposal/discharge requirements. Includes steam phase and cool down period.
Confirmational sampling: To confirm "long-term effectiveness" of the remediation performed.

Ag: silver
As: arsenic
Ba: barium
Be: beryllium
CEMS: continuous emissions monitoring system
Cd: cadmium
CO: carbon monoxide
CO_2: carbon dioxide
COCs: chemicals of concern (PAHs, PCP, dioxins/furans, As, Cr, Cu, and Zn)
Cl_2: chlorine gas
Cr: chromium
Cu: copper
HCl: hydrogen chloride
Hg: mercury
LIF: laser-induced fluorescence
NO_x: nitrogen oxides
O_3: ozone
PAHs: polynuclear aromatic hydrocarbons
Pb: lead
PCP: pentachlorophenol
PM: particulate matter
SAC: spent activated carbon
Sb: antimony
SO_x: sulfur oxides
SVOCs: semivolatile organic compounds
TAPs: toxic air pollutants
TCLP: toxicity characteristics leaching procedure
Th: thallium
TOC: total organic carbon
TPH: total petroleum hydrocarbons
VOCs: volatile organic compounds
Zn: zinc

Table 6-5
Perimeter Monitoring Wells to Be Sampled

Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
1	7	6	6	3	3
2	7	6	4	3	3
3	7	6	4	3	3

Table 6-6
Perimeter Monitoring Frequency

Years[1]	Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
0-7	1	Semi-annually				
	2					
	3					
7-30	1	Annually	Annually	Annually	5-years	5-years
	2	Annually	Annually	Annually	5-years	5-years
	3	Annually	Annually	Annually	5-years	5-years

[1]Years are from start of thermal remediation.

3400.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.55. QC & ANALYTICAL DATA VALIDATION								
3400.55. 5. DATA VALIDATION								
3400.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3400.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3400.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3400.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 1ST YEAR O&M	12.00 MO	1,089,932	64,060	156,120	918,523	5,108,094	7,336,729	611394.06

3405. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405. 2ND YEAR O&M									
3405. 5. GENERAL CONDITIONS									
3405. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

3405. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3405. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3405. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3405.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3405.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3405.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3405.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3405.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	1112378	MBT	0	0	0	0	3,893,323	3,893,323	3.50
@ $3.50									
USR AA Electricity for Electrodes			0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	22347	KKW	0	0	0	0	1,340,820	1,340,820	60.00
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	22347	KKW	0	0	0	0	-1340820	-1,340,820	-60.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	8760.00	KKW	0	0	0	0	525,600	525,600	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	93206	UNT	0	0	0	0	74,565	74,565	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	4,500,664	4,500,664	375055.32

3405.35. SITE O&M LABOR & MISC EQUIPME	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

3405.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	28500 LB	0	0	28,500	0	0	28,500	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	10000 LB	0	0	15,000	0	0	15,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	80,070	2,500	0	82,570	6880.83

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45. DISPOSALS								
3405.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3405.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	10000 LBS	0	0	0	5,200	0	5,200	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	5,200	0	5,200	433.33
3405.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	28500 LBS	0	0	0	13,110	0	13,110	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	13,110	0	13,110	1092.50
3405.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81
3405.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	218,524	0	234,734	19561.14

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.49. SAMPLING & ANALYSIS								
3405.49. 5. PERFORMANCE MONITORING								
3405.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3405.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3405.49.10. COMPLIANCE MONITORING								
3405.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3405.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3405.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00 0	0.00 0	5.02 20	0.00 0	0.00 0	5.02 20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3405.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00 0	0.00 0	0.00 0	140.00 1,960	0.00 0	140.00 1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00 0	0.00 0	0.00 0	155.00 2,170	0.00 0	155.00 2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00 0	0.00 0	0.00 0	950.00 4,750	0.00 0	950.00 4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00 0	0.00 0	99.00 1,188	0.00 0	0.00 0	99.00 1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00 0	0.00 0	5.02 60	0.00 0	0.00 0	5.02 60	5.02

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35
3405.49.10.25. SAMPLING TECHNICIANS								
3405.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3405.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3405.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3405.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.55. QC & ANALYTICAL DATA VALIDATION								
3405.55. 5. DATA VALIDATION								
3405.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3405.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3405.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3405.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50

3405.60. DEMOBE/DEMO SPH 6PH COMPONENT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.60. DEMOBE/DEMO SPH 6PH COMPONENTS									
USR AA Remove/Salvage SPT 6ph			0.00	0.00	0.00	37452.00	0.00	37452.00	
Aboveground Components	1.00	LS	0	0	0	37,452	0	37,452	37452.00
TOTAL DEMOBE/DEMO SPH 6PH COMPONENT	1.00	JOB	0	0	0	37,452	0	37,452	37452.00
TOTAL 2ND YEAR O&M	12.00	MO	1,093,804	67,420	141,370	1,030,046	4,515,738	6,848,378	570698.17

3410. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410. 3RD YEAR O&M								
3410. 5. GENERAL CONDITIONS								
3410. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3410. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3410. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3410.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3410.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3410.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3410.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3410.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	953472	MBT	0	0	0	0	3,337,152	3,337,152	3.50
@ $3.50									
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	7008.00	KKW	0	0	0	0	-420,480	-420,480	-60.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	7008.00	KKW	0	0	0	0	420,480	420,480	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	70080	UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	3,400,392	3,400,392	283366.00

3410.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3410.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	17813 LB	0	0	17,813	0	0	17,813	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	8000.00 LB	0	0	12,000	0	0	12,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	66,383	2,500	0	68,883	5740.25

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45. DISPOSALS								
3410.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3410.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	10000 LBS	0	0	0	5,200	0	5,200	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	5,200	0	5,200	433.33
3410.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	17813 LBS	0	0	0	8,194	0	8,194	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,194	0	8,194	682.83
3410.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81
3410.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	213,608	0	229,818	19151.48

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.49. SAMPLING & ANALYSIS								
3410.49. 5. PERFORMANCE MONITORING								
3410.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3410.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3410.49.10. COMPLIANCE MONITORING								
3410.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3410.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3410.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3410.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3410.49.10.25. SAMPLING TECHNICIANS

3410.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3410.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3410.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3410.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.55. QC & ANALYTICAL DATA VALIDATION								
3410.55. 5. DATA VALIDATION								
3410.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3410.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3410.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3410.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 3RD YEAR O&M	12.00 MO	1,093,804	67,420	127,683	641,254	3,415,466	5,345,627	445468.94

3415. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415. 4TH YEAR O&M								
3415. 5. GENERAL CONDITIONS								
3415. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3415. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3415. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3415.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3415.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3415.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3415.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3415.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	794557	MBT	0	0	0	0	2,780,950	2,780,950	3.50
@ $3.50									
USR AA Electircity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	7008.00	KKW	0	0	0	0	420,480	420,480	60.00
Plant, Steam: $60 per K KWH									
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	7008.00	KKW	0	0	0	0	-420,480	-420,480	-60.00
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	70080	UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	2,844,190	2,844,190	237015.79

3415.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3415.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	11875 LB	0	0	11,875	0	0	11,875	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	5000.00 LB	0	0	7,500	0	0	7,500	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	55,945	2,500	0	58,445	4870.42

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45. DISPOSALS								
3415.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3415.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	10000 LBS	0	0	0	5,200	0	5,200	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	5,200	0	5,200	433.33
3415.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	11875 LBS	0	0	0	5,463	0	5,463	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	5,463	0	5,463	455.21
3415.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81
3415.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	210,876	0	227,086	18923.85

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.49. SAMPLING & ANALYSIS								
3415.49. 5. PERFORMANCE MONITORING								
3415.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3415.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3415.49.10. COMPLIANCE MONITORING								
3415.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3415.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3415.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3415.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3415.49.10.25. SAMPLING TECHNICIANS

3415.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3415.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3415.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3415.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.55. QC & ANALYTICAL DATA VALIDATION									
3415.55. 5. DATA VALIDATION									
3415.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3415.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3415.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
3415.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50

3415.60. REMOVE/DEMO STEAM EQUIPMENT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.60. REMOVE/DEMO STEAM EQUIPMENT								
3415.60. 5. DEMOLITION/REMOVAL EQUIPMENT								
MIL AA Outside Equip. Operators, Med		56.51	0.00	0.00	0.00	0.00	56.51	
ium	80.00 HR	4,520	0	0	0	0	4,520	56.51
MIL AA Outside Laborers, (Semi-Skill		38.39	0.00	0.00	0.00	0.00	38.39	
ed)	320.00 HR	12,285	0	0	0	0	12,285	38.39
MIL AA Outside Plumbers		50.69	0.00	0.00	0.00	0.00	50.69	
	80.00 HR	4,055	0	0	0	0	4,055	50.69
MIL AA CRANE,HYD,TRK MTD, 4.5T/52'B		0.00	4.37	0.00	0.00	0.00	4.37	
OOM	80.00 HR	0	350	0	0	0	350	4.37
(ADD FLAT BED 43,000GVW TRUCK)								
TOTAL DEMOLITION/REMOVAL EQUIPMENT	1.00 JOB	20,860	350	0	0	0	21,210	21210.15
3415.60.10. DISPOSALS								
USR AA Disposal Misc Piping &		0.00	0.00	0.00	100.00	0.00	100.00	
Equipment, RCRA Landfill	100.00 TON	0	0	0	10,000	0	10,000	100.00
TOTAL DISPOSALS	1.00 JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00 MO	20,860	350	0	10,000	0	31,210	2600.85
TOTAL 4TH YEAR O&M	12.00 MO	1,114,665	67,770	117,245	648,522	2,859,264	4,807,465	400622.12

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420. 5TH YEAR O&M								
3420. 5. GENERAL CONDITIONS								
3420. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3420. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3420.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3420.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3420.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3420.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3420.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00	KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	7008.00	UNT	0	0	0	0	5,606	5,606	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	275,582	275,582	22965.20

3420.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3420.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	7125.00 LB	0	0	7,125	0	0	7,125	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	43,695	2,500	0	46,195	3849.58

3420.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.45. DISPOSALS								
3420.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3420.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	7125.00 LBS	0	0	0	3,278	0	3,278	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,278	0	3,278	273.13
3420.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3420.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81

3420.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.45.30. WASTE MISC COSTS									
USR AA RO/RO Rental			0.00	270.00	0.00	0.00	0.00	270.00	
	48.00	MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners			0.00	0.00	50.00	0.00	0.00	50.00	
	5.00	EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	203,491	0	219,701	18308.44

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49. SAMPLING & ANALYSIS								
3420.49. 5. PERFORMANCE MONITORING								
3420.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3420.49.10. COMPLIANCE MONITORING								
3420.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3420.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3420.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35
3420.49.10.25. SAMPLING TECHNICIANS								
3420.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3420.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3420.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3420.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.55. QC & ANALYTICAL DATA VALIDATION								
3420.55. 5. DATA VALIDATION								
3420.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3420.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3420.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 5TH YEAR O&M	12.00 MO	1,081,022	67,420	100,245	557,206	289,246	2,095,140	174595.02

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425. 6TH YEAR O&M								
3425. 5. GENERAL CONDITIONS								
3425. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3425. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3425.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3425.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3425.20. MATERIALS & SUPPLIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.20. MATERIALS & SUPPLIES									
USR AA Office Supplies			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00

3425.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3425.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements.									
Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00	KKW	0	0	0	0	262,800	262,800	60.00
Plant: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	7008.00	UNT	0	0	0	0	5,606	5,606	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	275,582	275,582	22965.20

3425.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3425.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	4750.00 LB	0	0	4,750	0	0	4,750	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	41,320	2,500	0	43,820	3651.67

3425.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.45. DISPOSALS								
3425.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3425.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	4750.00 LBS	0	0	0	2,185	0	2,185	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	2,185	0	2,185	182.08
3425.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3425.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81

3425.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	202,399	0	218,609	18217.39

3425.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49. SAMPLING & ANALYSIS									
3425.49. 5. PERFORMANCE MONITORING									
3425.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	52.00	EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	52.00	EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	304.16	0.00	0.00	304.16	
	14.00	EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)			0.00	0.00	0.00	55.00	0.00	55.00	
	58.00	EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
3425.49.10. COMPLIANCE MONITORING									
3425.49.10. 5. FUGITIVE EMISSIONS									
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow			0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00	EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.			0.00	0.00	925.00	0.00	0.00	925.00	
	4.00	EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses			0.00	0.00	200.00	0.00	0.00	200.00	
	1.00	LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags			0.00	0.00	200.00	0.00	0.00	200.00	
	12.00	MO	0	0	2,400	0	0	2,400	200.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3425.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3425.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3425.49.10.25. SAMPLING TECHNICIANS

3425.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3425.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3425.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.55. QC & ANALYTICAL DATA VALIDATION									
3425.55. 5. DATA VALIDATION									
3425.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3425.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3425.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 6TH YEAR O&M	12.00	MO	1,081,022	67,420	97,870	556,114	289,246	2,091,673	174306.06

3430. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430. 7TH YEAR O&M								
3430. 5. GENERAL CONDITIONS								
3430. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3430. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls			0.00	0.00	0.00	0.00	10.00	10.00	
	60.00	EA	0	0	0	0	600	600	10.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	4.00	DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
3430. 5.15. SITE SECURITY									
USR AA Security Guard Service 24 hr/			0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00	HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00	MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00	MO	66,207	0	0	167,400	1,878	235,485	19623.73

3430.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3430.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3430.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3430.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3430.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment			0.00	0.00	0.00	0.00	60.00	60.00	
	4380.00	KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	7008.00	UNT	0	0	0	0	5,606	5,606	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	275,582	275,582	22965.20

3430.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3430.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	2375.00 LB	0	0	2,375	0	0	2,375	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	38,945	2,500	0	41,445	3453.75

3430.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.45. DISPOSALS								
3430.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3430.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	2375.00 LBS	0	0	0	1,093	0	1,093	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	1,093	0	1,093	91.04
3430.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3430.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	85714 GAL	0	0	0	169,714	0	169,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	169,714	0	169,714	14142.81

3430.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	201,306	0	217,516	18126.35

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49. SAMPLING & ANALYSIS								
3430.49. 5. PERFORMANCE MONITORING								
3430.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3430.49.10. COMPLIANCE MONITORING								
3430.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Al low		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3430.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3430.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3430.49.10.25. SAMPLING TECHNICIANS

3430.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3430.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
3430.49.15. CONFIRMATIONAL SAMPLING								
3430.49.15.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA NAPL Mobility		0.00	0.00	0.00	200.00	0.00	200.00	
	11.00 EA	0	0	0	2,200	0	2,200	200.00
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	11.00 EA	0	0	0	957	0	957	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83	11.00 EA	0	0	0	1,771	0	1,771	161.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	180.00	0.00	180.00	
70)	11.00 EA	0	0	0	1,980	0	1,980	180.00
USR AA Sampling Drilling Rig		0.00	0.00	0.00	3000.00	0.00	3000.00	
Mobe/Demobe	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle		0.00	0.00	0.00	34.00	0.00	34.00	
Cuttinigs, Regrout Holes	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geolog		59.40	0.00	0.00	0.00	0.00	59.40	
ist	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	60,908	1,410	66,190	6619.00
3430.49.15.15. LIF SURVEY								
USR AA LIF Survey/Report		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL LIF SURVEY		0	0	0	5,000	0	5,000	
TOTAL CONFIRMATIONAL SAMPLING		3,872	0	0	65,908	1,410	71,190	
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	21,640	184,043	10,316	278,980	23248.33

3430.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.55. QC & ANALYTICAL DATA VALIDATION									
3430.55. 5. DATA VALIDATION									
3430.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3430.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3430.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60. DEMO/REMOVAL TREATMENT SYSTEM									
3430.60.02. GENERAL CONDITIONS									
3430.60.02.01. FIELD SUPERVISION & MANAGEMENT									
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.									
USR AA Prin. Engineer/Scientist I,			66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	200.00	HR	13,363	0	0	0	0	13,363	66.82
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	1000.00	HR	53,130	0	0	0	0	53,130	53.13
USR AA Secretary/Clerical II			19.32	0.00	0.00	0.00	0.00	19.32	
	1000.00	HR	19,320	0	0	0	0	19,320	19.32
USR AA Health & Safety Officer (HSO)			37.03	0.00	0.00	0.00	0.00	37.03	
	1000.00	HR	37,030	0	0	0	0	37,030	37.03
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P			0.00	5.50	0.00	0.00	0.00	5.50	
KUP	2000.00	HR	0	11,000	0	0	0	11,000	5.50
REF. EP 1110-1-8 4X2 3/4-TON									
USR AA Lodging;			0.00	0.00	0.00	0.00	1000.00	1000.00	
	6.00	MO	0	0	0	0	6,000	6,000	1000.00
USR AA M&IE			0.00	0.00	0.00	0.00	28.50	28.50	
	260.00	DAY	0	0	0	0	7,410	7,410	28.50
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	12.00	EA	0	0	0	0	6,000	6,000	500.00
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	12.00	EA	0	0	0	0	240	240	20.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	10000	MI	0	0	0	0	3,500	3,500	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	122,843	11,000	0	0	23,150	156,993	156993.00
3430.60.02.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	40.00	HR	4,136	0	0	0	0	4,136	103.40

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Prin. Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	400.00 HR	15,400	0	0	0	0	15,400	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	520.00 HR	30,888	0	0	0	0	30,888	59.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	40.00 HR	4,136	0	0	0	0	4,136	103.40
Health and Safety Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	40.00 HR	4,136	0	0	0	0	4,136	103.40
gr								
USR AA Mileage on Personal Car Pjm		0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	10000 MI	0	0	0	0	3,100	3,100	0.31
s*								
USR AA Lodging; three mo for PjM plu		0.00	0.00	0.00	0.00	80.00	80.00	
s	10.00 DAY	0	0	0	0	800	800	80.00
additional visits during								
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	10.00 DAY	0	0	0	0	380	380	38.00
USR AA Airfare Trips for HSM, QCSyst		0.00	0.00	0.00	0.00	500.00	500.00	
ems	2.00 EA	0	0	0	0	1,000	1,000	500.00
Mngr,								
USR AA Rental Car HSM visits (4) and		0.00	0.00	0.00	0.00	45.00	45.00	
2	6.00 DAY	0	0	0	0	270	270	45.00
visits by QC Systems Mgr.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	6.00 EA	0	0	0	0	120	120	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00 JOB	76,956	0	0	0	5,670	82,626	82626.00
3430.60.02.03. PURCHASING								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Secretary/Clerical IV Home		38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	16.00 HR	616	0	0	0	0	616	38.50

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PURCHASING	1.00	JOB	3,520	0	0	0	0	3,520	3520.00
3430.60.02.06. FIRST AID, FIRE, TRAFFIC, SECUR									
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S			56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00	EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower			145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00	EA	145	1	123	0	0	269	269.19
HTW AA Eye Wash Bowl			126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	4.00	EA	508	4	661	0	0	1,173	293.21
HTW AA First Aid Kit			0.00	0.00	75.00	0.00	0.00	75.00	
	16.00	EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher			0.00	0.00	150.00	0.00	0.00	150.00	
	2.00	EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00	JOB	1,773	15	3,458	0	0	5,247	5246.78
3430.60.02.07. HEALTH & SAFETY									
USR AA Decon Misc Items			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
USR AA Level C PPE			0.00	0.00	41.00	0.00	0.00	41.00	
	40.00	DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE			0.00	0.00	12.00	0.00	0.00	12.00	
	520.00	DAY	0	0	6,240	0	0	6,240	12.00
USR AA Install/Decon Personnel Decon			192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00	LS	192	1	250	0	0	443	443.30
USR AA Photo Ionization Detector			0.00	800.00	0.00	0.00	0.00	800.00	
	6.00	MO	0	4,800	0	0	0	4,800	800.00
USR AA Calibration Gasses			0.00	0.00	550.00	0.00	0.00	550.00	
	1.00	LS	0	0	550	0	0	550	550.00
USR AA LEL			0.00	350.00	0.00	0.00	0.00	350.00	
	6.00	MO	0	2,100	0	0	0	2,100	350.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Miniram			0.00	425.00	0.00	0.00	0.00	425.00	
	6.00	MO	0	2,550	0	0	0	2,550	425.00
USR AA Labor Allowance for Site Specific Training			120.00	0.00	0.00	0.00	0.00	120.00	
	10.00	EA	1,200	0	0	0	0	1,200	120.00
USR AA Labor Allowance for Physicals			200.00	0.00	0.00	0.00	0.00	200.00	
	10.00	EA	2,000	0	0	0	0	2,000	200.00
USR AA Physicals			0.00	0.00	0.00	350.00	0.00	350.00	
	10.00	EA	0	0	0	3,500	0	3,500	350.00
TOTAL HEALTH & SAFETY	1.00	JOB	3,392	9,451	9,180	3,500	0	25,523	25523.30
3430.60.02.09. TEMP CONSTRUCTION FACILITIES									
USR AA Fax Machine			0.00	0.00	300.00	0.00	0.00	300.00	
	1.00	EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service			0.00	0.00	0.00	0.00	75.00	75.00	
	6.00	MO	0	0	0	0	450	450	75.00
USR AA Dumpster			0.00	0.00	0.00	0.00	200.00	200.00	
	6.00	MO	0	0	0	0	1,200	1,200	200.00
USR AA Copy Machine			0.00	0.00	0.00	0.00	400.00	400.00	
	6.00	MO	0	0	0	0	2,400	2,400	400.00
USR AA Office Supplies			0.00	0.00	0.00	0.00	200.00	200.00	
	6.00	MO	0	0	0	0	1,200	1,200	200.00
USR AA Port-a-Johns			0.00	0.00	0.00	0.00	85.00	85.00	
	12.00	MO	0	0	0	0	1,020	1,020	85.00
USR AA Office Furniture Rental			0.00	0.00	400.00	0.00	0.00	400.00	
	6.00	MO	0	0	2,400	0	0	2,400	400.00
USR AA Sewer			0.00	0.00	0.00	200.00	0.00	200.00	
	6.00	MO	0	0	0	1,200	0	1,200	200.00
USR AA Contractors Office Trailer			0.00	600.00	0.00	0.00	0.00	600.00	
	6.00	MO	0	3,600	0	0	0	3,600	600.00
USR AA Storage Trailer			0.00	100.00	0.00	0.00	0.00	100.00	
	6.00	MO	0	600	0	0	0	600	100.00
USR AA Postage and Courier Service			0.00	0.00	0.00	0.00	50.00	50.00	
	6.00	MO	0	0	0	0	300	300	50.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	1.00 EA	0	3,000	0	0	0	3,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	1.00 EA	0	2,000	0	0	0	2,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	1.00 EA	0	100	0	0	0	100	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	1.00 EA	0	0	0	600	0	600	600.00
USR AA Small Tool Allowance		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Water Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	9,300	4,700	4,500	6,570	25,070	25070.00
3430.60.02.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	300.00	300.00	
	6.00 MO	0	0	0	0	1,800	1,800	300.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	6.00 MO	0	0	0	0	2,700	2,700	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	6.00 MO	0	0	0	600	1	601	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	600	4,501	5,101	5100.60
TOTAL GENERAL CONDITIONS	1.00 JOB	208,485	29,766	17,338	8,600	39,891	304,080	304079.67

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60.05. DEMO GWTP									
L UPB AA CRANE,HYD,S/P,RT,4WD,40T/84'B			56.51	116.82	0.00	0.00	0.00	173.32	
OOM	160.00	HR	9,041	18,691	0	0	0	27,732	173.32
CIV AA Demo Welded Steel Pipe, 4" Di			7.63	1.07	0.00	0.00	0.00	8.70	
a	2000.00	LF	15,259	2,132	0	0	0	17,391	8.70
CIV AA Demo Welded St Pipe 6" to 12"			14.17	1.98	0.00	0.00	0.00	16.15	
Dia	400.00	LF	5,668	792	0	0	0	6,459	16.15
L AIR AA Structure Demo			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
L AIR AA Equipment Demo/Removal			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
TOTAL DEMO GWTP	1.00	JOB	50,760	34,260	0	0	0	85,020	85019.86
3430.60.10. DEMO PIPING									
L CIV AA Demo Welded Steel Pipe, 4" Di			2.48	0.35	0.00	0.00	0.00	2.83	
a	31320	LF	77,661	10,849	0	0	0	88,510	2.83
L CIV AA Demo Welded St Pipe 6" to 12"			6.20	0.87	0.00	0.00	0.00	7.06	
Dia	4000.00	LF	24,796	3,464	0	0	0	28,260	7.06
TOTAL DEMO PIPING	1.00	JOB	102,457	14,313	0	0	0	116,770	116769.92
3430.60.15. PLUG & ABANDON WELLS									
USR AA Plug and Abandon Injection &			0.00	0.00	0.00	6.00	0.00	6.00	
Extraction Wells	36851	LFT	0	0	0	221,106	0	221,106	6.00
USR AA Plug & Abandon VEA & DPT at			0.00	0.00	0.00	100.00	0.00	100.00	
Surface	400.00	EA	0	0	0	40,000	0	40,000	100.00
TOTAL PLUG & ABANDON WELLS	1.00	JOB	0	0	0	261,106	0	261,106	261106.00
3430.60.20. DISPOSALS									
USR AA Transportation & Disposal at			0.00	0.00	0.00	200.00	0.00	200.00	
RCRA Landfill (Non-Hazardous)	2000.00	TON	0	0	0	400,000	0	400,000	200.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Transportation & Disposal -			0.00	0.00	0.00	1000.00	0.00	1000.00	
Hazardous	200.00	TON	0	0	0	200,000	0	200,000	1000.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	600,000	0	600,000	600000.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	361,701	78,339	17,338	869,706	39,891	1,366,975	113914.62
TOTAL 7TH YEAR O&M	12.00	MO	1,446,596	145,759	112,833	1,490,635	330,547	3,526,371	293864.22

3435. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435. 8TH YEAR O&M								
3435. 5. GENERAL CONDITIONS								
3435. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	8.00 HR	827	0	0	0	0	827	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	4.00 HR	290	0	0	0	0	290	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	4.00 HR	339	0	0	0	0	339	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00 HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	4.00 HR	414	0	0	0	0	414	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	2.00 HR	207	0	0	0	0	207	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	400.00 MI	0	0	0	0	124	124	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	2.00 DAY	0	0	0	0	84	84	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	2.00 EA	0	0	0	0	20	20	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00

3435. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	5,711	0	0	0	318	6,029	502.43
TOTAL GENERAL CONDITIONS	12.00 MO	5,711	0	0	0	318	6,029	502.43

3435.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.49. SAMPLING & ANALYSIS								
3435.49.10. COMPLIANCE MONITORING								
3435.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	138.00 EA	0	0	0	19,320	0	19,320	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	138.00 EA	0	0	0	21,390	0	21,390	155.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	18.00 EA	0	0	1,782	0	0	1,782	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	18.00 EA	0	0	90	0	0	90	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	1,912	40,710	0	42,622	3551.86
3435.49.10.25. SAMPLING TECHNICIANS								
3435.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00

3435.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3435.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43

3435.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.55. QC & ANALYTICAL DATA VALIDATION									
3435.55. 5. DATA VALIDATION									
3435.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL MONITORING WELL SAMPLES	1.00	YR	2,376	0	0	0	0	2,376	2376.00
TOTAL DATA VALIDATION	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL 8TH YEAR O&M	12.00	MO	42,196	0	2,912	40,910	9,224	95,242	7936.86
TOTAL McCORMICK&BAXTER SUPERFUND SI	1.00	EA	13829255	793,605	7,947,475	15902716	17466494	55,939,544	55939544.42

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	AASBC	2 B-asbtswkr + Small Tools			PROD = 100%				CREW HOURS =	1381
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
MIL	B-ASBTSWKRF	Asbestos Workers	0.50	HR	62.89	0.50	31.44			31.44
MIL	XMIXX020 E	Small Tools	0.68	HR	1.57			0.68	1.07	1.07
	TOTAL					2.50	156.22	0.68	1.07	157.29
	AASBG	3 B-asbtswkr + 1 Flatbed Truck			PROD = 100%				CREW HOURS =	1
MIL	XMIXX010 E	Misc. Power Tools	0.50	HR	6.40			0.50	3.20	3.20
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	B-ASBTSWKRF	Asbestos Workers	1.00	HR	62.89	1.00	62.89			62.89
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
	TOTAL					3.00	187.66	3.50	19.73	207.39
	ACARA	1 B-carpnter + Small Tools			PROD = 100%				CREW HOURS =	40
MIL	B-CARPNTERL	Carpenters	1.00	HR	44.71	1.00	44.71			44.71
MIL	B-CARPNTERF	Carpenters	0.25	HR	45.21	0.25	11.30			11.30
MIL	XMIXX020 E	Small Tools	0.31	HR	1.57			0.31	0.49	0.49
	TOTAL					1.25	56.01	0.31	0.49	56.50
	CLACC	3 B-laborer + 1 Hand Compaction Rammer			PROD = 100%				CREW HOURS =	29
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	C10WC003 E	COMPACTOR, RAMMER, 13"X11" SHOE	1.00	HR	2.33			1.00	2.33	2.33
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					3.00	115.67	1.23	2.69	118.36
	CODEA	1 B-eqoprcrn + 1 1 Cy Hydr. Excavator			PROD = 100%				CREW HOURS =	17
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	H25CA004 E	HYD EXCAV,CRWLR, 1.00CY BKT,LON	1.00	HR	42.66			1.00	42.66	42.66
MIL	XMIXX020 E	Small Tools	0.11	HR	1.57			0.11	0.17	0.17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	97.06	1.11	42.83	139.89
	CODEJ	2 B-laborer + 1 Loader/Backhoe			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.13	HR	1.57			0.13	0.20	0.20
	TOTAL					3.25	143.01	1.13	18.19	161.20

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	CODEP	4 B-plumber + 1 1.5 Cy Hydr. Excavator, Cwlr				PROD = 100%			CREW HOURS =	57
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	2.00	HR	50.69	2.00	101.38			101.38
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER F	Plumbers	1.00	HR	51.19	1.00	51.19			51.19
MIL	H25CA016 E	HYD EXCAV, CRWLR, 1.50 CY BKT	1.00	HR	61.83			1.00	61.83	61.83
MIL	XMIXX020 E	Small Tools	1.02	HR	1.57			1.02	1.60	1.60
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					6.00	292.07	3.02	69.91	361.98
	CODLB	1 B-eqoprmed + 1 1.5 Cy Front End Ldr, Cwlr				PROD = 100%			CREW HOURS =	17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50	HR	38.39	0.50	19.19			19.19
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
	TOTAL					1.50	76.20	1.00	32.06	108.26
	CODTK	1 B-eqoprmed + 1 Dozer/Roller, Cat D-8L, 335 Hp				PROD = 100%			CREW HOURS =	114
MIL	B-EQOPRCRNF	Equip. Operators, Crane/Shovel	0.25	HR	59.17	0.25	14.79			14.79
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	R40SO001 E	ROLLR,VIB,SD,TOW,SHPF,25.5T,72"	1.00	HR	25.53			1.00	25.53	25.53
MIL	T10CA017 E	BLADE, UNIVERSAL, HYDR (FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
	TOTAL					1.25	73.46	3.00	121.45	194.91
	COETF	2 B-laborer + 1 8 Cy Dump Truck,Bckhoe/Loadr				PROD = 100%			CREW HOURS =	6
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.37	HR	1.57			0.37	0.58	0.58
MIL	T40XX008 E	REAR DUMP BODY, 8 CY,(30,000 GV	1.00	HR	2.75			1.00	2.75	2.75
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
	TOTAL					4.00	177.65	3.37	54.97	232.62
	COETL	3 B-laborer + 2 12 Cy Dump Trck/CrawlrLoadr				PROD = 100%			CREW HOURS =	80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	2.00	HR	43.87	2.00	87.73			87.73
MIL	L35CA007 E	LDR,FE, CRWLR, 3.75 CY	1.00	HR	84.68			1.00	84.68	84.68
MIL	XMIXX020 E	Small Tools	0.28	HR	1.57			0.28	0.44	0.44
MIL	T40XX010 E	REAR DUMP BODY,12 CY,(36,000 GV	2.00	HR	2.82			2.00	5.63	5.63
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	2.00	HR	33.66			2.00	67.31	67.31
	TOTAL					6.00	259.91	5.28	158.06	417.97

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	COFGA	1 B-eqoprmed + 1 Grader 12-G			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
	TOTAL					2.00	95.40	1.00	33.04	128.44
	COKBD	2 B-laborer + 1 Bitum.Dist.Truck/Sweepr			PROD = 100%				CREW HOURS =	1
MIL	A25RS007 E	ASPH DISTR, 3000 GAL, (ADD TR	1.00	HR	15.33			1.00	15.33	15.33
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-TRKDVRLTL	Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	B15MB004 E	STR SWEEPER, 7'W/SPRINKER, TOWE	1.00	HR	4.05			1.00	4.05	4.05
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
	TOTAL					4.00	163.13	4.00	67.28	230.41
	COMCE	Dozer D6 + Dozer D8 + Ripper + Truck			PROD = 100%				CREW HOURS =	30
MIL	B20VE001 E	BRUSH CHIPPER, 6" DIA. LOG, TRL	2.00	HR	15.44			2.00	30.89	30.89
MIL	L10BS002 E	MULTIAPPLIC RAKE FOR D8L TRACTO	2.00	HR	4.98			2.00	9.96	9.96
MIL	R10CA011 E	RIPPER,SING-SHNK BEAM, HYD, D-8	1.00	HR	8.33			1.00	8.33	8.33
MIL	R10CA013 E	RIPPER, SHANKS EA, D-8	1.00	HR	0.72			1.00	0.72	0.72
MIL	T10CA010 E	BLADE, ANGLE, HYDR, FOR D6	1.00	HR	4.32			1.00	4.32	4.32
MIL	T10CA011 E	WINCH,(W/O CABLE),FOR D6 TRACTO	1.00	HR	5.55			1.00	5.55	5.55
MIL	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA008 E	DOZER,CWLR,D-6D,PS,(ADD BLADE)	1.00	HR	35.45			1.00	35.45	35.45
MIL	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T50FO004 E	TRK,HWY,4X4,F250,3/4T,8800 GVW	1.00	HR	8.70			1.00	8.70	8.70
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	B-EQOPRLT L	Eq Oper, Light	2.00	HR	54.50	2.00	108.99			108.99
MIL	B-EQOPRMEDL	Eq Oper, Medium	2.00	HR	56.51	2.00	113.01			113.01
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	38.39	4.00	153.56			153.56
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
	TOTAL					9.00	414.45	14.00	202.98	617.43
	EELEB	2 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	2208
MIL	B-ELECTRN F	Electricians	0.50	HR	36.43	0.50	18.21			18.21
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					2.50	90.07	0.23	0.36	90.43
	EELEF	4 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	391
MIL	B-ELECTRN F	Electricians	0.66	HR	36.43	0.66	24.04			24.04
MIL	B-ELECTRN A	Electricians	2.00	HR	29.72	2.00	59.44			59.44
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.45	HR	1.57			0.45	0.71	0.71
	TOTAL					4.66	155.34	0.45	0.71	156.04

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MPLUA	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	854
MIL	B-PLUMBER F	Plumbers	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	XMIXX020 E	Small Tools	0.34	HR	1.57			0.34	0.53	0.53
	TOTAL					1.25	63.49	0.34	0.53	64.02
	MPLUC	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	74
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.10	HR	51.19	0.10	5.12			5.12
MIL	XMIXX020 E	Small Tools	0.19	HR	1.57			0.19	0.30	0.30
	TOTAL					1.10	55.81	0.19	0.30	56.11
	MPLUE	1 B-plumber/laborer + Small Tools			PROD = 100%				CREW HOURS =	1344
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.67	HR	1.57			0.67	1.05	1.05
	TOTAL					2.50	114.67	0.67	1.05	115.72
	MPLUJ	2 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	658
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
	TOTAL					3.50	157.12	1.01	1.59	158.70
	MPLUK	2 B-plumber + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	418
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					3.50	157.12	2.01	3.23	160.35
	MSPFA	1 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	2469
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	XMIXX020 E	Small Tools	0.36	HR	1.57			0.36	0.57	0.57
	TOTAL					1.25	63.49	0.36	0.57	64.05

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MSPFB	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	2126
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFD	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	63
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFE	2 B-stm/pipe + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	6243
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					2.50	118.73	1.72	2.78	121.50
	MSPFH	2 B-stm/pipe + 1 200 Amp Welding Machine			PROD = 100%				CREW HOURS =	318
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	XMIXX020 E	Small Tools	0.82	HR	1.57			0.82	1.29	1.29
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					3.25	144.32	1.82	7.77	152.09
	ULABB	2 B-laborer + Small Tools			PROD = 100%				CREW HOURS =	129
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50	HR	38.89	0.50	19.44			19.44
MIL	XMIXX020 E	Small Tools	0.27	HR	1.57			0.27	0.42	0.42
	TOTAL					2.50	96.22	0.27	0.42	96.65
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS =	52
MIL	A30BG003 E	ASPH FINISHER, 10'W/SCREED,PNEU	1.00	HR	57.79			1.00	57.79	57.79
MIL	B15MB002 E	STR SWEEPER, 7'W/SPRINKER	1.00	HR	1.64			1.00	1.64	1.64
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	R30IG008 E	ROLLER,STATIC,3WHL,S/P, 12T,84"	2.00	HR	16.60			2.00	33.20	33.20
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	7.00	HR	38.39	7.00	268.73			268.73
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	3.00	HR	56.51	3.00	169.52			169.52
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRHVL	Outside Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
	TOTAL					12.00	539.12	10.00	140.56	679.68
	XLABB	2 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	77
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					2.34	90.00	1.00	1.57	91.57
	XLABC	3 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	6
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					3.34	128.39	1.00	1.57	129.96
	XPLUC	1 X-plumber + Small Tools			PROD = 100%				CREW HOURS =	12
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-PLUMBER F	Outside Plumbers	0.17	HR	51.19	0.17	8.70			8.70
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					3.17	136.17	1.00	1.57	137.74
	XSABA	3 X-eqoprmed + 1 Grader, 2 Rollers, 3 Trucks			PROD = 100%				CREW HOURS =	3
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	2.00	HR	42.48	2.00	84.96			84.96
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	T60KI002 E	TRK,WTR,OF-HY, 6000GAL,W/CAT621	1.00	HR	61.65			1.00	61.65	61.65
MIL	A10ET001 E	CHIPSPREADER,S/P, 10'W, MECH	1.00	HR	18.31			1.00	18.31	18.31
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T10CA016 E	BLADE, STRAIGHT, HYDR (FOR D8	1.00	HR	7.45			1.00	7.45	7.45
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
	TOTAL					8.00	370.15	6.00	240.47	610.62
	XSGRA	3 X-eqoprmed + 1 Shpf Roller,Grader,Water Truck			PROD = 100%				CREW HOURS =	25
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRK	1.00	HR	3.40			1.00	3.40	3.40
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
	TOTAL					6.00	289.28	6.00	88.82	378.09
	XXPLA	3 X-laborer + 1 20 Ton Crane, Hydraulic R/T			PROD = 100%				CREW HOURS =	498
MIL	C75GV002 E	CRANE,HYD,S/P,RT,4WD,20T/70'BOO	1.00	HR	33.07			1.00	33.07	33.07
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
MIL	X-PLUMBER F	Outside Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					5.50	247.96	2.00	34.64	282.60
	XXQOK	1 X-eqoprhvy + 1 25 Ton Shear/Hydr. Excavator			PROD = 100%				CREW HOURS =	160
MIL	H25CA007 E	HYD EXCAV, CRWLR, 2.00 CY BKT	1.00	HR	88.70			1.00	88.70	88.70
MIL	H25LU009 E	SHEAR,32"OPEN,32"THROAT, 9'0"RC	1.00	HR	28.11			1.00	28.11	28.11
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
	TOTAL					1.00	56.51	2.00	116.82	173.32

** LABOR BACKUP **

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	A-1E/S III	Engineer/Scientist III	23.00	0.0%	61.0%	0.00	0.00	37.03	HR	06/05/01	0.00	4400
USR	A-1E/S IV	Engineer/Scientist IV	27.00	0.0%	61.0%	0.00	0.00	43.47	HR	06/05/01	0.00	68360
USR	A-1PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	61.0%	0.00	0.00	66.82	HR	06/05/01	0.00	3600
USR	A-1S/C II	Secretary/Clerical II	12.00	0.0%	61.0%	0.00	0.00	19.32	HR	06/05/01	0.00	4400
USR	A-1SE/SII	Senior Engineer/Scientist II	33.00	0.0%	61.0%	0.00	0.00	53.13	HR	06/05/01	0.00	66266
USR	A-1SE/SIV	Senior Engineer/SCientist IV	38.50	0.0%	61.0%	0.00	0.00	61.99	HR	06/05/01	0.00	14568
USR	A-1T- VI	Technician VI	22.00	0.0%	61.0%	0.00	0.00	35.42	HR	06/05/01	0.00	20
USR	A2-E/SII	Engineer/Scientist II	19.00	0.0%	120.0%	0.00	0.00	41.80	HR	06/05/01	0.00	3900
USR	A2-E/SIII	Engineer/Scientist III	23.00	0.0%	120.0%	0.00	0.00	50.60	HR	06/05/01	0.00	80
USR	A2-E/SIV	Engineer/Scientist IV	27.00	0.0%	120.0%	0.00	0.00	59.40	HR	06/05/01	0.00	9727
USR	A2-PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	120.0%	0.00	0.00	91.30	HR	06/05/01	0.00	2844
USR	A2-PE/SIII	Prin. Engineer/Scientist III	47.00	0.0%	120.0%	0.00	0.00	103.40	HR	06/05/01	0.00	3439
USR	A2-S/CIV	Secretary/Clerical IV	17.50	0.0%	120.0%	0.00	0.00	38.50	HR	06/05/01	0.00	3610
USR	A2-SE/SI	Senior Engineer/Scientist I	30.50	0.0%	120.0%	0.00	0.00	67.10	HR	06/05/01	0.00	3000
USR	A2-SE/SII	Senior Engineer/Scientist II	33.00	0.0%	120.0%	0.00	0.00	72.60	HR	06/05/01	0.00	9188
USR	A2-SE/SIII	Senior Engineer/Scientist III	36.00	0.0%	120.0%	0.00	0.00	79.20	HR	06/05/01	0.00	240
USR	A2-SE/SIV	Senior Engineer/Scientist IV	38.50	0.0%	120.0%	0.00	0.00	84.70	HR	06/05/01	0.00	3586
USR	A2-T/AIV	Technician IV	15.00	0.0%	120.0%	0.00	0.00	33.00	HR	06/05/01	0.00	2256
USR	A2-T/AVI	Technician VI	22.00	0.0%	120.0%	0.00	0.00	48.40	HR	06/05/01	0.00	2064
MIL	B-ASBTSWKR	Asbestos Workers	38.50	0.0%	41.4%	7.93	0.00	62.39	HR	06/05/01	25.09	3455
MIL	B-CARPNTER	Carpenters	23.45	0.0%	41.4%	11.54	0.00	44.71	HR	06/05/01	22.87	50
MIL	B-ELECTRN	Electricians	21.95	0.0%	41.5%	4.88	0.00	35.93	HR	06/05/01	27.92	7419
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	32.23	0.0%	41.4%	13.0%	0.00	58.67	HR	06/05/01	23.41	217
MIL	B-EQOPRLT	Equip. Operators, Light	29.28	0.0%	41.5%	13.0%	0.00	54.50	HR	06/05/01	15.97	60
MIL	B-EQOPRMED	Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	15.97	344
MIL	B-LABORER	Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	12.50	4151
MIL	B-PLUMBER	Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	22.98	6084
MIL	B-STM/PIPE	Steam / Pipefitters	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	27.95	24881
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	11.56	168
MIL	B-TRKDVRLT	Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	9.51	1
MIL	X-EQOPRMED	Outside Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	21.21	1029
MIL	X-LABORER	Outside Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	9.72	2572
MIL	X-PLUMBER	Outside Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	20.49	4241
MIL	X-TRKDVRHV	Outside Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	19.23	52
MIL	X-TRKDVRLT	Outside Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	17.09	31

** EQUIPMENT BACKUP **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	TOTAL ** HOURS
UPB	A10ET001	CHIPSPREADER,S/P, 10'W, MECH	5.67	1.96	3.75	0.93	0.26	0.04	5.70	18.31 HR	3
UPB	A25RS007	ASPH DISTR, 3000 GAL	3.98	1.10	4.32	1.42			4.51	15.33 HR	1
UPB	A30BG003	ASPH FINISHER, 10'W/SCREED,PNEUM	18.65	6.46	4.91	1.42	1.16	0.18	25.01	57.79 HR	52
UPB	B15MB002	STR SWEEPER, 7'W/SPRINKER	0.64	0.18		0.14			0.69	1.64 HR	52
UPB	B15MB004	STR SWEEPER, 7'W/SPRINKER, TOWED	0.86	0.25	1.56	0.38	0.05	0.01	0.94	4.05 HR	1
MIL	B20VE001	B-CHIPPER, 6" DIA LOG, TRLR-MTD	1.61	0.45	8.56	2.82	0.04	0.01	1.96	15.44 HR	60
MIL	C10WC003	COMPACTOR, RAMMER, 11"X13" SHOE	0.62	0.11	0.48	0.12			1.00	2.33 HR	29
MIL	C75GV002	CRANE,HYD,S/P,RT,4WD,20T/70'BOOM	10.81	4.66	3.88	1.20	1.14	0.18	11.20	33.07 HR	498
MIL	C80PA003	CRANE,HYD,TRK MTD, 4.5T/52'BOOM	1.95	0.81		0.10			1.51	4.37 HR	80
UPB	F10CA024	FORK LIFT,R/T 8,000#,16.00'L-HT	3.62	1.31	2.15	0.53	0.52	0.08	3.72	11.94 HR	160
UPB	G15CA003	GRADER,MOTOR, ARTIC, CAT 12-G	10.86	4.86	3.92	1.37	0.55	0.09	11.39	33.04 HR	39
MIL	H25CA004	HYD EXCAV,CRWLR, 1.00CY BKT,LONG	15.83	4.80	3.63	1.42			16.98	42.66 HR	17
UPB	H25CA007	HYD EXCAV, CRWLR, 2.00 CY BKT	31.61	10.66	7.26	2.84			36.33	88.70 HR	160
UPB	H25CA016	HYD EXCAV, CRWLR, 1.50 CY BKT	22.50	6.83	6.01	2.35			24.14	61.83 HR	57
UPB	H25LU009	SHEAR,32"OPEN,32"THROAT, 9'0"RCH	11.27	2.23		1.70			12.92	28.11 HR	160
MIL	L10BS002	MULTI-APPLICATION RAKE, 12.5W 9T	1.82	0.50		0.30			2.35	4.98 HR	60
UPB	L35CA004	LDR,FE, CRWLR, 1.50 CY	8.68	2.93	2.75	1.07			16.64	32.06 HR	20
UPB	L35CA007	LDR,FE, CRWLR, 3.75 CY	22.94	7.73	7.21	2.82			43.98	84.68 HR	80
MIL	L40CA001	LDR,FE, WH, 1.25 CY, ARTIC, 910E	5.79	2.23	2.06	0.89	0.83	0.13	6.01	17.93 HR	120
UPB	L50CA003	LDR,BH,WH, 1.38CY FE BKT, 30"DIP	5.53	2.11	2.44	0.80	0.48	0.07	6.55	17.99 HR	17
UPB	R10CA011	RIPPER, 1-SHANK BEAM,HYD, D-8	3.21	0.89		0.10			4.14	8.33 HR	30
UPB	R10CA013	RIPPER, SHANKS EACH, D-8	0.28	0.08					0.36	0.72 HR	30
UPB	R30CA001	ROLLR,STATIC,S/P,13T,84"W,11TIRE	5.11	1.54	2.44	0.60	0.98	0.15	4.75	15.58 HR	77
UPB	T10CA010	BLADE, ANGLE, HYDR, D-6	1.71	0.58		0.08			1.96	4.32 HR	30
MIL	T10CA011	WINCH, (ADD CABLE), D-6	2.20	0.74		0.08			2.53	5.55 HR	30
UPB	T10CA016	BLADE, STRAIGHT, HYDR, D-8	2.95	0.99		0.12			3.38	7.45 HR	3
UPB	T10CA017	BLADE, UNIVERSAL, HYDR, D-8	3.15	1.06		0.13			3.61	7.95 HR	144
MIL	T15CA008	DOZER,CWLR, D-6D,PS	9.01	3.34	4.80	1.78			16.52	35.45 HR	30
MIL	T15CA015	DOZER,CWLR, D-8L,PS	26.41	8.90	11.50	3.32			37.85	87.97 HR	147
MIL	T30DW001	TRENCHR,CHN, 24"DP,6"W,WLK-BEHND	0.41	0.12	0.78	0.22	0.04	0.01	0.51	2.08 HR	32
UPB	T40XX008	REAR DUMP BODY, 8.0CY	1.20	0.33		0.09			1.13	2.75 HR	6
UPB	T40XX010	REAR DUMP BODY, 12.0CY	1.23	0.34		0.09			1.16	2.82 HR	160
MIL	T40XX016	FLATBED, 8'x 16.0'	0.34	0.09					0.27	0.71 HR	53
UPB	T40XX033	WATER TANK, 3000 GAL	1.63	0.45					1.32	3.40 HR	25
MIL	T50FO002	TRK,HWY, 6,250GVW,4X4, 1/2T-PKUP	1.75	0.49	2.41	0.70	0.22	0.03	1.91	7.52 HR	640
UPB	T50FO004	TRK,HWY, 8,800GVW,4X4, 3/4T-PKUP	2.03	0.56	2.83	0.82	0.23	0.03	2.21	8.70 HR	30
UPB	T50FO011	TRK,HWY, 24,700 GVW, 4X2, 2 AXLE	2.87	0.97	4.94	1.32	1.03	0.16	2.96	14.25 HR	106
MIL	T50KE003	TRK,HWY, 46,000 GVW, 6X4, 3 AXLE	9.42	2.64	9.46	2.73	0.44	0.07	8.89	33.66 HR	193
UPB	T60KI002	TRK,WTR,OF-HY, 6000GAL,W/CAT621E	18.15	7.76	10.45	3.45	4.07	0.63	17.13	61.65 HR	3
UPB	W35XX002	WELDER, 200 AMP, W/1 AXLE TRLR	0.49	0.17	4.18	1.03	0.03	0.01	0.57	6.48 HR	375
UPB	W35XX009	WELDER, 300 AMP, SKID,ELEC DRIVE	0.37	0.09	0.66	0.27			0.26	1.65 HR	6661
UPB	XMIXX010	MISC. POWER TOOLS	2.17	0.76	0.60	0.27			2.60	6.40 HR	1
UPB	XMIXX020	SMALL TOOLS	0.50	0.22	0.16	0.07			0.63	1.57 HR	12083

McCORMICK & BAXTER SUPERFUND SITE

6/5/01

ASSUMED MARKUPS ON LABOR FOR ESTIMATE

	FICA	FUTA	SUI	WC	BENEFITS	OH	TOTAL
OFFICE STAFF (MANAGERS, ENGINEERS, CLERICAL)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	**120.00%**
FIELD STAFF (ENGINEERS, MANAGERS, TECHNICIANS)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	**61.00%**
CRAFT LABOR	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	**41.45%**

NOTES:

1 Workmans Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction.
Workmans Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group

2 Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group.
Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.

3 Overhead rates for craft labor are based on RS Means averages for larger construction companies.
Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resourses), training, medical surveillance, and other costs directly associated with craft labor.
Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group.
Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office.
Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).

4 State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

** PROJECT SETTINGS **

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 0.0%

DATE OF ESCALATION SCHEDULE : 07/13/01

PROJECT DIRECT COST COLUMNS

Col Type	L	E	M	U	U
Rep Width	10	10	10	10	10
Title	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER

PROJECT INDIRECT COST COLUMNS

Col Type	U	P	B	X	X
Rep Width	10	10	10	0	0
Title	G&A	PROFIT	BOND	<Unused>	<Unused>

PROJECT OWNER COST COLUMNS

Col Type	U	U	X	X	X
Rep Width	10	10	0	0	0
Title	SCP CONT	BID CONT	<Unused>	<Unused>	<Unused>

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	5	.	ACCOUNT	0
Level 2 ID :	2	.	SYSTEM	0
Level 3 ID :	2	.	SUBSYSTM	0
Level 4 ID :	2	.	ASSY CAT	0
Level 5 ID :	2	.	ASSEMBLY	0
Level 6 ID :	2	.	LEVEL 6	0

Owner Cost Level : 2

** PROJECT SETTINGS **

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)
Shadow	X	X	X	X	X

DETAIL REPORT FORMATTING

PAGE OPTIONS
Page Break Levels : 2
Table of Contents Levels : 4

		0	1	2	3	4	5	6	7
ROW OPTIONS	Print Titles at Levels :		Y	Y	Y	Y	Y	Y	
	Print Totals at Levels :		Y	Y	Y	Y	Y	Y	
	Print Notes at Levels :	Y	Y	Y	Y	Y	Y	Y	Y
	Print Unit Cost Row :	Y							
	Print Page Footer :	N							
	Show Cost Codes :	Y							
COLUMNS OPTIONS	Print Crew Id :	N							
	Crew Output :	N							
	Unit Cost :	Y							
UPB TITLES	No. of Levels to Print :	0							
	Bracket Titles With :	< >							
	Include titles Notes :	Y							

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 G&A : G&A; 60
Column 2 PROFIT : PROFIT; 100
Column 3 BOND : BOND; 0.50
Column 4 <Unused> :
Column 5 <Unused> :

Column 1 SCP CONT : Scope Contingency
Column 2 BID CONT : Bid Contingency
Column 3 <Unused> :
Column 4 <Unused> :
Column 5 <Unused> :

STANDARD COLUMN WIDTHS

Quantity Columns : 8
Total cost Columns : 12
Unit Cost Columns : 14

SUMMARY FEATURES

Round Totals Column : N-None
Contingency Notes : Yes
Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)
Show Markup at Level : 2
Display Indirect/Owner Markup as : B - Percent of Total
CSI Sort at Level : (None)

** PROJECT SETTINGS **

REPORT SELECTION

Project Settings : Y Profit Guidelines : N
Contractor Settings : Y
Link Listing : N Measurement Units : U.S.

	REPORT FORMAT TYPE			FOR LEVEL (S)						
	Direct	Indirect	Owner	0	1	2	3	4	5	6
Detail :	Y									
Project :	N	Y	N		Y	Y	Y	N	N	N
Contractor :	N	N		N	N	N	N	N	N	N
Division :	N	N	N	N	N	N	N	N	N	N
System :	N	N	N	N	N	N	N	N	N	N
2nd View :	N									
Crew :	Y			Y	N	N	N	N	N	N
Labor :	Y									
Equipment :	Y									
Prime Labor Cost Level :	N									

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3300.05 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3300.10 SUBMITTALS/IMPLEMENTATION PLANS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3300.12 ENGINEERING							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.15 MOBE, SITE WORK, TEMP FACILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.20 TREATMENT SYSTEM CONSTRUCTION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.25 START UP, TESTING, O&M PLAN							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.30 DEMOBILIZATION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3400.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3400.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

			AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3405.45 DISPOSALS								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3405.49 SAMPLING & ANALYSIS								
	Scope Contingency	P		10.00				
	Bid Contingency	P		5.00				
3405.55 QC & ANALYTICAL DATA VALIDATION								
	Scope Contingency	P		5.00				
	Bid Contingency	P		5.00				
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410. 5 GENERAL CONDITIONS								
	Scope Contingency	P		5.00				
	Bid Contingency	P		5.00				
3410.10 SITE FACILITIES								
	Scope Contingency	P		5.00				
	Bid Contingency	P		5.00				
3410.15 HEALTH & SAFETY								
	Scope Contingency	P		5.00				
	Bid Contingency	P		5.00				
3410.20 MATERIALS & SUPPLIES								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410.25 MAINTENANCE								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410.30 UTILITIES								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410.35 SITE O&M LABOR & MISC EQUIPMENT								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410.40 CHEMICALS								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				
3410.45 DISPOSALS								
	Scope Contingency	P		10.00				
	Bid Contingency	P		10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3410.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3410.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3415.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3415.60 REMOVE/DEMO STEAM EQUIPMENT							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3420. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3420.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3425.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3425.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3430.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3430.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.60 DEMO/REMOVAL TREATMENT SYSTEM							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3435.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** CONTRACTOR SETTINGS **

	AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor										
G&A; 6%	6.00									
PROFIT; 10%	10.00									
BOND; 0.5%	0.50									
PL Mechanical Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
PV Paving Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
EL Electrical Contractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									

No errors detected...

* * * END OF ERROR REPORT * * *

APPENDIX B

Thermal Treatment Scenario #2—
MPA, CPA, North-MPA, South-MPA, and South-CPA

APPENDIX B-1

Cost Estimate Summary—
Scenario #2

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - THERMAL TREATMENT TECHNOLOGY
MAIN PROCESS AREA (MPA), CELLON PROCESS AREA (CPA), NORTH-MPA
SOUTH-MPA, AND SOUTH-CPA

SCENARIO 2 - MPA, CPA, N-MPA, S-MPA, S-CPA

CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:
MPA and CPA are historic sources of NAPL. N-MPA, S-MPA, and S-CPA have subsurface NAPL. Scenario 2 contains 2.10 million cubic yards of impacted soil (71 percent of estimated volume of impacted soil). This scenario included thermal treatment by steam and electrical resistance heating; vapor and NAPL/groundwater extraction and treatment; treated water reinjection; and short- and long-term site monitoring for 30 years.

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300 CAPITAL COSTS					
3300.05 GENERAL CONDITIONS					
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1	JOB	1,540,060.00	1,540,060	6 months of procurement, 18 months of construction support.
3300.05.02 ADMINISTRATION HOME OFFICE	1	JOB	468,967.00	468,967	Management and cost control.
3300.05.03 PURCHASING	1	JOB	145,143.00	145,143	Procurement of equipment, materials, supplies, subcontractors.
3300.05.06 FIRST AID, FIRE, TRAFFIC & SECURITY	1	JOB	160,127.00	160,127	Includes 24-hour security.
3300.05.07 HEALTH & SAFETY	1	JOB	85,407.00	85,407	Equipment and supplies, site-specific training and medical.
3300.05.09 TEMPORARY CONSTRUCTION FACILITIES	1	JOB	139,225.00	139,225	Contractor's office and storage, utility connections.
3300.05.10 PROJECT UTILITIES	1	JOB	22,150.00	22,150	Service fees for construction period.
3300.05.15 PATENT FEES	1	JOB	117,183.00	117,183	Allocation of $100,000; fee structure has not been determined.
SUBTOTAL GENERAL CONDITIONS	**1**	**JOB**		**2,678,262**	
Scope Contingencies 5%				133,913	Risk associated with incomplete design.
SUBTOTAL				**2,812,175**	
Bid Contingencies 10%				281,218	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCLUDING CONTINGENCY				**3,093,393**	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS					
3300.10.01 Construction Work Plan	1	EA	14,331.00	14,331	Work activities, sequence, and schedules.
3300.10.02 Contractors Quality Control Management Plan	1	EA	8,556.00	8,556	Quality control responsibility, procedures, and corrective action.
3300.10.03 Contractors Chemical Quality Control Plan	1	EA	16,141.00	16,141	Chemical quality control responsibility, controls, validation
3300.10.05 Regulatory Compliance Plan/Update	1	EA	45,643.00	45,643	Regulatory requirements, reporting, and compliance activities.
3300.10.06 Traffic Routing Plan	1	EA	2,319.00	2,319	Impact to W. Washington Street, internal traffic routing & safety.
3300.10.07 Site Health and Safety Plan	1	EA	13,834.00	13,834	Worker and visitor health and safety requirements, procedures.
3300.10.15 Performance Testing Plan	1	EA	12,566.00	12,566	Boiler source testing, emissions control system requirements.
3300.10.41 Subcontracting Plan	1	EA	2,811.00	2,811	Competitive and non-discriminatory policies and procedures.
3300.10.42 Environmental Protection Plan	1	EA	3,905.00	3,905	Site-specific policies and procedures.
3300.10.43 Correct/Emerg Contingency Action Plan	1	EA	3,591.00	3,591	Emergency response policies and procedures.
SUBTOTAL SUBMITTALS/IMPLEMENTATION PLANS	**1**	**JOB**		**123,697**	
Scope Contingencies 5%				6,185	Risk associated with incomplete design.
SUBTOTAL				**129,882**	
Bid Contingencies 5%				6,494	Risks associated with changed conditions after contract award.
TOTAL SUBMITTALS/IMPLEMENTATION PLANS INCL. CONTINGENCY				**136,376**	
3300.12 ENGINEERING					
3300.12.10 Completion Design - Civil	1	JOB	215,804.00	215,804	Building structure, concrete, pipelines, utility extensions.
3300.12.15 Completion Design - Process	1	JOB	504,824.00	504,824	Wastewater treatment system, equipment, plant piping
3300.12.20 Completion Design - Electrical	1	JOB	114,968.00	114,968	Services, controls, lighting, instrumentation, motors.
3300.12.26 PCS Programming	1	JOB	35,937.00	35,937	Process control, programmable logic control, interfaces.
3300.12.32 Completion Design - Mechanical	1	JOB	75,208.00	75,208	Piping, instrumentation, HVAC, plumbing.
3300.12.37 Completion Design - Specialty Subcontractor	1	JOB	937,464.00	937,464	Steam and electrical resistance heating, instrumentation, controls.
SUBTOTAL ENGINEERING	**1**	**JOB**		**1,884,205**	
Scope Contingencies 10%				188,421	Risk associated with incomplete design.
SUBTOTAL				**2,072,626**	
Bid Contingencies 10%				207,263	Risks associated with changed conditions after contract award.
TOTAL ENGINEERING INCLUDING CONTINGENCY				**2,279,888**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300.15 MOBE, SITE WORK, TEMP FACILITIES					
3300.15.01 CLEAR SITE BRUSH	30	ACR	723.52	21,706	Site preparation for field activities.
3300.15.02 MOBE EQUIP & FACILITIES	1	JOB	1,505.00	1,505	Heavy equipment, personnel to project site.
3300.15.05 TEMPORARY FACILITIES	1	JOB	306,006.00	306,006	Trailers, utilities (water, sewer, electricity, gas, phones), paving.
3300.15.08 SIGNS, BARRICADES	1	JOB	93,223.00	93,223	Traffic, dust, erosion, and site cleaning.
3300.15.10 GRAVEL CAP	12.7	ACR	26,685.62	338,907	12.7 acres, 6-inch thick for site access, fugitive emissions control.
3300.15.15 ASPHALT CAP	4222	SY	26.07	110,068	0.9 acre, 4-inch thick for Cellon Process Area emission control.
3300.15.92 SURVEYS	1	JOB	33,983.00	33,983	Layout and construction control surveys.
3300.15.97 MEETINGS	2	EA	6,700.22	13,400	Preconstruction meeting, coordination meetings.
SUBTOTAL MOBE, SITE WORK, TEMP FACILITIES	**1**	**JOB**		**918,798**	
Scope Contingencies 10%				91,880	Risk associated with incomplete design.
SUBTOTAL				**1,010,678**	
Bid Contingencies 10%				101,068	Risks associated with changed conditions after contract award.
TOTAL MOBE, SITE WORK, TEMP FACILITIES INCL CONTINGENCY				**1,111,746**	
3300.20 TREATMENT SYSTEM CONSTRUCTION					
3300.20.01 TREATMENT PLANT BUILDING	1	JOB	503,139.00	503,139	Temporary (Sprung or Rubb type), 100 ft by 200 ft, concrete slab.
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1	JOB	5,588,429.00	5,588,429	Expedite fabrication, submittals, purchasing, shipping & install.
3300.20.07 WELL INSTRUMENTS/CONTROLS	1	JOB	2,762,508.00	2,762,508	Cables, vertical electrode arrays, instruments, and power supply.
3300.20.10 INSTALL WELLS	1	JOB	10,692,256.00	10,692,256	Extraction, injection wells, instrumentation, and pumps.
3300.20.15 PIPING	1	JOB	5,211,004.00	5,211,004	Steam, vapor, NAPL/groundwater, air piping, headers and laterals.
SUBTOTAL TREATMENT SYSTEM CONSTRUCTION	**1**	**JOB**		**24,757,336**	
Scope Contingencies 10%				2,475,734	Risk associated with incomplete design.
SUBTOTAL				**27,233,070**	
Bid Contingencies 10%				2,723,307	Risks associated with changed conditions after contract award.
TOTAL TREATMENT SYSTEM CONSTRUCTION INCL CONTINGENCY				**29,956,377**	
3300.25 STARTUP, TESTING, O&M MANUAL					
3300.25.05 O&M MANUAL	1	JOB	50,439.00	50,439	Operation and maintenance procedures and system control.
3300.25.10 STARTUP/COMMISSION TREATMENT SYSTEM	1	JOB	649,962.00	649,962	Startup, equipment shake-down, training and testing.
SUBTOTAL STARTUP, TESTING, O&M MANUAL	1	JOB		**700,401**	
Scope Contingencies 10%				70,040	Risk associated with incomplete design.
SUBTOTAL				**770,441**	
Bid Contingencies 10%				77,044	Risks associated with changed conditions after contract award.
TOTAL STARTUP, TESTING, O&M MANUAL INCL CONTINGENCY				**847,485**	
3300.30 DEMOBILIZATION					
3300.30.21 DEMOBILIZATION (CONSTRUCTION)	1	JOB	16,606.00	16,606	Remove construction equipment and personnel from site.
3300.30.22 REPORTS, CLOSEOUT	1	JOB	170,074.00	170,074	Closeout of chemical testing, health & safety, record drawings.
SUBTOTAL DEMOBILIZATION	**1**	**JOB**		**186,680**	
Scope Contingencies 10%				18,668	Risk associated with incomplete design.
SUBTOTAL				**205,348**	
Bid Contingencies 10%				20,535	Risks associated with changed conditions after contract award.
TOTAL DEMOBILIZATION INCLUDING CONTINGENCY				**225,883**	
TOTAL CAPITAL COSTS	**1**	**JOB**		**31,249,379**	
TOTAL CAPITAL COST, INCLUDING CONTINGENCY				**$ 37,651,147**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400 1ST YEAR O&M					
3400.05 GENERAL CONDITIONS					
3400.05.05 OFFSITE ADMINISTRATIVE COSTS	12	MO	10,164.14	121,970	Management, administration, procurement, and data analysis.
3400.05.10 ERH SYSTEM OP/REPORTING	12	MO	33,829.17	405,950	Process control and monitoring for ERH system.
3400.05.15 SITE SECURITY	12	MO	12,831.54	153,978	Site security and control, 24 hours per day.
SUBTOTAL GENERAL CONDITIONS				**681,898**	
Scope Contingencies 5%				34,095	Risk associated with incomplete design.
SUBTOTAL				**715,993**	
Bid Contingencies 5%				35,800	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCL CONTINGENCY				**751,793**	
3400.10 SITE FACILITIES	**12**	**MO**	**4,542.79**	**54,513**	Electrical, mechanical, and instrumentation support, facilities.
Scope Contingencies 5%				2,726	Risk associated with incomplete design.
SUBTOTAL				**57,239**	
Bid Contingencies 5%				2,862	Risks associated with changed conditions after contract award.
TOTAL SITE FACILITIES INCLUDING CONTINGENCY				**60,101**	
3400.15 HEALTH & SAFETY	**12**	**MO**	**925.75**	**11,109**	Personal protective equipment, health and safety monitoring.
Scope Contingencies 5%				555	Risk associated with incomplete design.
SUBTOTAL				**11,664**	
Bid Contingencies 5%				583	Risks associated with changed conditions after contract award.
TOTAL HEALTH & SAFETY INCLUDING CONTINGENCY				**12,248**	
3400.20 MATERIALS & SUPPLIES	**12**	**MO**	**351.55**	**4,219**	Routine maintenance supplies and materials.
Scope Contingencies 10%				422	Risk associated with incomplete design.
SUBTOTAL				**4,640**	
Bid Contingencies 10%				464	Risks associated with changed conditions after contract award.
TOTAL MATERIALS & SUPPLIES INCL CONTINGENCY				**5,105**	
3400.25 MAINTENANCE	**12**	**MO**	**7,820.01**	**93,840**	Parts, PLC and well maintenance, well redevelopment.
Scope Contingencies 10%				9,384	Risk associated with incomplete design.
SUBTOTAL				**103,224**	
Bid Contingencies 10%				10,322	Risks associated with changed conditions after contract award.
TOTAL MAINTENANCE INCL CONTINGENCY				**113,547**	
3400.30 UTILITIES	**12**	**MO**	**740741.13**	**8,888,894**	Electricity and natural gas purchase; co-generation credit, water.
Scope Contingencies 10%				888,889	Risk associated with incomplete design.
SUBTOTAL				**9,777,783**	
Bid Contingencies 10%				977,778	Risks associated with changed conditions after contract award.
TOTAL UTILITIES INCLUDING CONTINGENCY				**10,755,561**	
3400.35 SITE O&M LABOR & MISC EQUIPMENT	**12**	**MO**	**94,376.34**	**1,132,516**	Plant manager and operators, 3 shifts per day, 365 days per year.
Scope Contingencies 10%				113,252	Risk associated with incomplete design.
SUBTOTAL				**1,245,768**	
Bid Contingencies 10%				124,577	Risks associated with changed conditions after contract award.
TOTAL SITE O&M LABOR & MISC EQ INCL CONTINGENCY				**1,370,344**	
3400.40 CHEMICALS	**12**	**MO**	**10,461.51**	**125,538**	Granular activated carbon, water treatment chemicals.
Scope Contingencies 10%				12,554	Risk associated with incomplete design.
SUBTOTAL				**138,092**	
Bid Contingencies 10%				13,809	Risks associated with changed conditions after contract award.
TOTAL CHEMICALS INCLUDING CONTINGENCY				**151,901**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400.45 DISPOSALS					
3400.45.05 SLUDGE	12	MO	3,339.72	40,077	360 tons per year, offsite disposal.
3400.45.10 CARBON (GAC, VAPOR PHASE)	12	MO	609.35	7,312	Steam regeneration; offsite disposal of 12,000 pounds per year.
3400.45.15 CARBON (GAC, LIQUID PHASE)	12	MO	1,808.04	21,696	Steam regeneration; offsite disposal of 40,250 pounds per year.
3400.45.20 PPE & MISC	12	MO	195.31	2,344	Disposal allowance.
3400.45.25 OILY WASTE	12	MO	21,268.71	255,225	Average recovery, 110,000 gal/year; 770,000 gal over 7 years.
3400.45.30 WASTE MISC COSTS	12	MO	1,259.72	15,117	Tanks and liners, recurring waste handling and loadouts.
SUBTOTAL DISPOSALS				**341,770**	
Scope Contingencies 10%				34,177	Risk associated with incomplete design.
SUBTOTAL				**375,947**	
Bid Contingencies 10%				37,595	Risks associated with changed conditions after contract award.
TOTAL DISPOSALS INCLUDING CONTINGENCY				**413,542**	
3400.49 SAMPLING & ANALYSIS					
3400.49.05 PERFORMANCE MONITORING	12	MO	1,471.36	17,656	See Table 3-1 of Cost Estimate Report.
3400.49.10 COMPLIANCE MONITORING	12	MO	19,056.66	228,680	See Table 3-1 of Cost Estimate Report.
SUBTOTAL SAMPLING & ANALYSIS	**12**	**MO**		**246,336**	
Scope Contingencies 10%				24,634	Risk associated with incomplete design.
SUBTOTAL				**270,970**	
Bid Contingencies 5%				13,548	Risks associated with changed conditions after contract award.
TOTAL SAMPLING & ANALYSIS INCL CONTINGENCY				**284,518**	
3400.55 QC & ANALYTICAL DATA VALIDATION					
3400.55.05 DATA VALIDATION	12	MO	2,262.22	27,147	Validation of chemical data for air, water, and process control.
SUBTOTAL QC & ANALYTICAL DATA VALIDATION	**12**	**MO**		**27,147**	
Scope Contingencies 5%				1,357	Risk associated with incomplete design.
SUBTOTAL				**28,504**	
Bid Contingencies 5%				1,425	Risks associated with changed conditions after contract award.
TOTAL QC & ANALYTICAL DATA VALIDATION INCL CONTINGENCY				**29,929**	
TOTAL 1ST YEAR O&M	**12**	**MO**		**11,607,780**	
TOTAL 1ST YEAR O&M COST, INCLUDING CONTINGENCY				$ 13,948,589	

TOTAL McCORMICK & BAXTER SUPERFUND SITE SCENARIO 2

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Five Year Review Report	5	1	EA	5,000	5,000	1 report at end of Year 5
Update O&M Plan	5	1	EA	1,500	1,500	Update Plan
Five Year Review Report	10	1	EA	5,000	5,000	1 report at end of Year 10
Five Year Review Report	15	1	EA	5,000	5,000	1 report at end of Year 15
Five Year Review Report	20	1	EA	5,000	5,000	1 report at end of Year 20
Five Year Review Report	25	1	EA	5,000	5,000	1 report at end of Year 25
Remedial Action Report	30	1	EA	300,000	300,000	Final Report
Equipment Repairs/Replacement:						
Replace Well Extract/LoFlo Pumps	5	138	EA	4,000	552,000	Replacement during active treatment.
Replace Well LoFlo Pumps	10	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	15	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	20	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	25	25	EA	1,000	25,000	Replacements during monitoring phase.
Well Repairs/Replacement:						
Replace Monitoring Wells	10	10	EA	17,000	170,000	Assume replace 10 wells every 10 yr.
Replace Monitoring Wells	20	10	EA	17,000	170,000	(Add 20K/event for demo/disposals)
Demolition/Restoration Site	30	1	JOB	500,000	500,000	<Includes removal of monitoring wells

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE	NOTES
Capital Cost	0	37,651,147	1.00000	37,651,147	
O&M STEAM INJECT YEAR 1	1	13,948,589	0.93458	13,036,064	
O&M STEAM INJECT YEAR 2	2	12,826,166	0.87344	11,202,870	<Includes demo ERH system
O&M STEAM INJECT YEAR 3	3	10,032,692	0.81630	8,189,665	
O&M STEAM INJECT YEAR 4	4	8,852,526	0.76290	6,753,550	
O&M COOL DOWN YEAR 5	5	3,125,012	0.71299	2,228,090	
O&M COOL DOWN YEAR 6	6	3,099,921	0.66634	2,065,608	
O&M COOL DOWN YEAR 7	7	5,040,474	0.62275	3,138,954	<Includes demo GWTP, piping & wells
O&M MONITORING WELLS	8 to 10	385,170	0.54393	209,507	at end of cool down phase.
O&M MONITORING WELLS	10 to 15	641,950	0.42924	275,552	Only monitoring wells remain.
O&M MONITORING WELLS	15 to 20	641,950	0.30604	196,465	
O&M MONITORING WELLS	20 to 25	641,950	0.21821	140,077	
O&M MONITORING WELLS	25 to 30	641,950	0.15558	99,873	
Periodic Cost	5	558,500	0.71299	398,203	
Periodic Cost	10	200,000	0.50835	101,670	
Periodic Cost	15	30,000	0.36245	10,873	
Periodic Cost	20	200,000	0.25842	51,684	
Periodic Cost	25	30,000	0.18425	5,527	
Periodic Cost	30	800,000	0.13137	105,094	Restore Site/Abandon Wells

TOTAL COSTS 30 YEARS	**$99,347,997**	
TOTAL PRESENT VALUE OF SCENARIO 2		**$ 85,860,473**

APPENDIX B-2

Costlink© Scenario #2—Capital Costs and Operation & Maintenance Estimate

---

McCORMICK & BAXTER SUPERFUND SITE
THERMAL TREATMENT

SCENARIO 2
CAPITAL COSTS & O&M

Designed By: URS Corporation
Estimated By: URS Staff

Prepared By: John E. Spear

Preparation Date: 10/27/01
Effective Date of Pricing: 07/13/01
Est Construction Time: 600 Days

Sales Tax: 0.08

C o s t L i n k
Software Copyright (c) 1985-1998
by Building Systems Design, Inc.
Release 1.6c

CONTRACT DACA67-98-D-1005, DO #65 THERMAL TREATMENT TECHNOLOGY CONCEPTUAL DESIGN, COST ESTIMATION AND FOCUSED FEASIBILITY SUPPORT McCORMICK & BAXTER SUPERFUND SITE, STOCKTON, CALIFORNIA

SCENARIO 2, TREATMENT OF PRIORITY 1 & 2 SOILS ONLY INCLUDING: MPA, N-MPA, CPA, S-CPA & S-MPA

SUMMARY REPORTS SUMMARY PAGE

PROJECT INDIRECT SUMMARY - ACCOUNT.....1
PROJECT INDIRECT SUMMARY - SYSTEM.....2
PROJECT INDIRECT SUMMARY - SUBSYSTM.....7

DETAILED ESTIMATE DETAIL PAGE

3300. CAPITAL COSTS
05. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT.....1
02. ADMINISTRATION HOME OFFICE.....2
03. PURCHASING.....3
06. FIRST AID, FIRE, TRAFFIC, SECUR.....3
07. HEALTH & SAFETY.....3
09. TEMP CONSTRUCTION FACILITIES.....4
10. PROJECT UTILITIES.....6
15. PATENT FEES.....6
10. SUBMITTALS/IMPLEMENTATION PLANS
01. Construction Work Plan.....7
02. Contractors QC Management Plan.....7
03. Contractors Chem Quality Control.....8
05. Regulatory Compliance Plan/Updat.....8
06. Traffic Routing Plan.....9
07. Site Health and Safety Plan.....9
15. Performance Testing Plan.....10
41. Subcontracting Plan.....10
42. Environmental Protection Plan.....11
43. Correct/Emerg Conting Action Pln.....11
12. ENGINEERING
10. COMPLETION DESIGN - CIVIL.....13
15. COMPLETION DESIGN - PROCESS.....13
20. COMPLETION DESIGN - ELECTRICAL.....14
26. PCS PROGRAMMING - GROUNDWATER
15. PC PROGRAMMING.....14
20. MMI PROGRAMMING.....15
32. COMPLETION DESIGN - MECHANICAL.....15
37. COMPLETE DESIGN - SPECIALTY SUB.....16
15. MOBE, SITE WORK, TEMP FACILITIES
01. CLEAR SITE BRUSH.....17
02. MOBE EQUIP & FACILITIES.....17
05. TEMPORARY FACILITIES
20. TEMPORARY PAVING.....17
25. WATER LINE.....18
30. PHONE.....19
35. SEWER.....19
40. ELECTRICAL SERVICE.....20
45. GAS SERVICE.....20
08. SIGNS, BARRICADES
5. SIGNS.....21
10. BARRICADES/TEMP FENCING.....21
15. EROSION CONTROL.....22

DETAILED ESTIMATE DETAIL PAGE

20. STREET CLEANING....22
25. DUST CONTROL....22
10. GRAVEL CAP....23
15. ASPHALT CAP....23
92. SURVEYS
5. INITIAL LAYOUT SURVEY....23
10. SURVEY CONTROLS....23
97. MEETINGS
01. Preconstruction Meeting....24
03. Coordination Meeting....25
20. TREATMENT SYSTEM CONSTRUCTION
01. TREATMENT PLANT BUILDING....26
05. TREATMENT SYSTEM EQUIP. F&I
5. EXPEDITOR/QC EQUIP. FABRICATION....26
01. EQUIP SUBMITTAL REVIEW....26
10. EQUIPMENT PURCHASE/SHIPPING....27
12. INSTRUMENTATION/CONTROLLERS....29
13. COMPUTER....30
15. EQUIPMENT INSTALLATION....30
16. TREATMENT SYSTEM ELECTRICAL & IN....30
17. MECHANICAL....31
20. SPH 6Ph HEATING COMPONENTS....31
25. VEA & DPT COMPONENTS....32
07. WELL INSTRUMENTS/CONTROLS
10. INSTRUMENT CABLE TO WELLHEADS....32
30. WELL INSTRUMENTATION....33
35. VERTICAL ELECTRODE ARRAYS....33
40. ELECTRICAL POWER TO WELLS....34
10. INSTALL WELLS
5. EXTRACTION WELLS THERMAL....34
10. STEAM INJECTION WELLS....37
15. REINJECTION WELLS....38
20. MONITORING WELLS....39
25. TREAT WELL DRILL LIQUIDS/CUTTING....41
30. ANALYTICALS SOILS....41
35. ANALYTICALS LIQUIDS....42
40. LABOR & ODC's....42
15. PIPING
5. VAPOR RECOVERY SYSTEM....44
10. LIQUID RECOVERY SYSTEM....46
11. EXTRACTION WELLHEAD SPOOL/FTG....47
15. STEAM INJECTION SYSTEM....47
20. H2O REINJECTION SYSTEM....50
25. STEAM GENERATION SYSTEM....51
30. WATER TREATMENT SYSTEM....51
35. AIR PIPING....52
25. START UP, TESTING, O&M PLAN
5. O&M MANUAL
10. PCS Commissioning Manual....54
13. Preliminary Draft - O&M Manual....54
18. Revised Draft - O&M Manual....55

DETAILED ESTIMATE DETAIL PAGE

23. Final - O&M Manual....55
10. STARTUP/COMMISSION TREATMENT SYS
5. ENGINEERS & TECHNICIANS....56
10. TRAVEL & PER DIEM....58
15. EQUIPMENT/SUPPLIES....58
25. UTILITIES/SITE FACILITIES....58
26. OPERATING/PROCESS UTILITIES....59
30. CHEMICALS....60
35. FILTERS, OTHER CONSUMABLES....61
40. HEALTH & SAFETY....61
45. DISPOSALS STARTUP....61
50. PERSONNEL TRAINING....62
55. SAMPLING/ANALYSIS; STARTUP....62
60. SOURCE TEST....65
30. DEMOBILIZATION
21. DEMOBILIZATION
01. Removal of Temp Facilities....66
02. Removal of Temp Utilities....66
04. Demobe of Construction Equipment....66
22. REPORTS, CLOSEOUT
5. Closeout Safety Report....67
10. Record Drawings....67
15. Chemical Data Final Report....67
20. Remedial Action Report....68
3400. 1ST YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....69
10. ERH SYSTEM OP/REPORTING....70
15. SITE SECURITY....70
10. SITE FACILITIES....71
15. HEALTH & SAFETY....72
20. MATERIALS & SUPPLIES....73
25. MAINTENANCE....74
30. UTILITIES....75
35. SITE O&M LABOR & MISC EQUIPMENT....76
40. CHEMICALS....77
45. DISPOSALS
5. SLUDGE....78
10. CARBON (GAC, VAPOR PHASE)....78
15. CARBON (GAC, LIQUID PHASE)....78
20. PPE & MISC....78
25. OILY WASTE....79
30. WASTE MISC COSTS....79
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....80
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....80
10. PERIMETER MONITORING WELLS....81
15. WASTE DISPOSAL CHARACTERIZATION....81
20. GWTP DISCHARGE TO REINJECT WELLS....82

DETAILED ESTIMATE DETAIL PAGE

25. SAMPLING TECHNICIANS....83
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....85
10. MONITORING WELL SAMPLES....85
15. AIR MONITORING SAMPLES....85
20. MISC SAMPLES....85
3405. 2ND YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....86
10. ERH SYSTEM OP/REPORTING....87
15. SITE SECURITY....87
10. SITE FACILITIES....88
15. HEALTH & SAFETY....89
20. MATERIALS & SUPPLIES....90
25. MAINTENANCE....91
30. UTILITIES....92
35. SITE O&M LABOR & MISC EQUIPMENT....93
40. CHEMICALS....94
45. DISPOSALS
5. SLUDGE....95
10. CARBON (GAC, VAPOR PHASE)....95
15. CARBON (GAC, LIQUID PHASE)....95
20. PPE & MISC....95
25. OILY WASTE....96
30. WASTE MISC COSTS....96
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....97
10. SOIL SAMPLING (DRILL BACK)....97
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....98
10. PERIMETER MONITORING WELLS....99
15. WASTE DISPOSAL CHARACTERIZATION....99
20. GWTP DISCHARGE TO REINJECT WELLS....100
25. SAMPLING TECHNICIANS....101
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....103
10. MONITORING WELL SAMPLES....103
15. AIR MONITORING SAMPLES....103
20. MISC SAMPLES....103
60. DEMOBE/DEMO SPH 6PH COMPONENTS....104
3410. 3RD YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....105
15. SITE SECURITY....106
10. SITE FACILITIES....107
15. HEALTH & SAFETY....108
20. MATERIALS & SUPPLIES....109
25. MAINTENANCE....110

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....111
35. SITE O&M LABOR & MISC EQUIPMENT....112
40. CHEMICALS....113
45. DISPOSALS
5. SLUDGE....114
10. CARBON (GAC, VAPOR PHASE)....114
15. CARBON (GAC, LIQUID PHASE)....114
20. PPE & MISC....114
25. OILY WASTE....115
30. WASTE MISC COSTS....115
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....116
10. SOIL SAMPLING (DRILL BACK)....116
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....117
10. PERIMETER MONITORING WELLS....118
15. WASTE DISPOSAL CHARACTERIZATION....118
20. GWTP DISCHARGE TO REINJECT WELLS....119
25. SAMPLING TECHNICIANS....120
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....122
10. MONITORING WELL SAMPLES....122
15. AIR MONITORING SAMPLES....122
20. MISC SAMPLES....122
3415. 4TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....123
15. SITE SECURITY....124
10. SITE FACILITIES....125
15. HEALTH & SAFETY....126
20. MATERIALS & SUPPLIES....127
25. MAINTENANCE....128
30. UTILITIES....129
35. SITE O&M LABOR & MISC EQUIPMENT....130
40. CHEMICALS....131
45. DISPOSALS
5. SLUDGE....132
10. CARBON (GAC, VAPOR PHASE)....132
15. CARBON (GAC, LIQUID PHASE)....132
20. PPE & MISC....132
25. OILY WASTE....133
30. WASTE MISC COSTS....133
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....134
10. SOIL SAMPLING (DRILL BACK)....134
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....135
10. PERIMETER MONITORING WELLS....136

DETAILED ESTIMATE DETAIL PAGE

15. WASTE DISPOSAL CHARACTERIZATION.....136
20. GWTP DISCHARGE TO REINJECT WELLS.....137
25. SAMPLING TECHNICIANS.....138
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....140
10. MONITORING WELL SAMPLES.....140
15. AIR MONITORING SAMPLES.....140
20. MISC SAMPLES.....140
60. REMOVE/DEMO STEAM EQUIPMENT
5. DEMOLITION/REMOVAL EQUIPMENT.....141
10. DISPOSALS.....141
3420. 5TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....142
15. SITE SECURITY.....143
10. SITE FACILITIES.....144
15. HEALTH & SAFETY.....145
20. MATERIALS & SUPPLIES.....146
25. MAINTENANCE.....147
30. UTILITIES.....148
35. SITE O&M LABOR & MISC EQUIPMENT.....149
40. CHEMICALS.....150
45. DISPOSALS
5. SLUDGE.....151
15. CARBON (GAC, LIQUID PHASE).....151
20. PPE & MISC.....151
25. OILY WASTE.....151
30. WASTE MISC COSTS.....152
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS).....153
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS.....153
10. PERIMETER MONITORING WELLS.....154
15. WASTE DISPOSAL CHARACTERIZATION.....155
20. GWTP DISCHARGE TO REINJECT WELLS.....155
25. SAMPLING TECHNICIANS.....156
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....158
10. MONITORING WELL SAMPLES.....158
20. MISC SAMPLES.....158
3425. 6TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....159
15. SITE SECURITY.....160
10. SITE FACILITIES.....161
15. HEALTH & SAFETY.....162
20. MATERIALS & SUPPLIES.....163
25. MAINTENANCE.....164

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....165
35. SITE O&M LABOR & MISC EQUIPMENT....166
40. CHEMICALS....167
45. DISPOSALS
5. SLUDGE....168
15. CARBON (GAC, LIQUID PHASE)....168
20. PPE & MISC....168
25. OILY WASTE....168
30. WASTE MISC COSTS....169
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....170
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....170
10. PERIMETER MONITORING WELLS....171
15. WASTE DISPOSAL CHARACTERIZATION....172
20. GWTP DISCHARGE TO REINJECT WELLS....172
25. SAMPLING TECHNICIANS....173
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....175
10. MONITORING WELL SAMPLES....175
20. MISC SAMPLES....175
3430. 7TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....176
15. SITE SECURITY....177
10. SITE FACILITIES....178
15. HEALTH & SAFETY....179
20. MATERIALS & SUPPLIES....180
25. MAINTENANCE....181
30. UTILITIES....182
35. SITE O&M LABOR & MISC EQUIPMENT....183
40. CHEMICALS....184
45. DISPOSALS
5. SLUDGE....185
15. CARBON (GAC, LIQUID PHASE)....185
20. PPE & MISC....185
25. OILY WASTE....185
30. WASTE MISC COSTS....186
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....187
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....187
10. PERIMETER MONITORING WELLS....188
15. WASTE DISPOSAL CHARACTERIZATION....189
20. GWTP DISCHARGE TO REINJECT WELLS....189
25. SAMPLING TECHNICIANS....190
15. CONFIRMATIONAL SAMPLING
10. SOIL SAMPLING (DRILL BACK)....191

DETAILED ESTIMATE DETAIL PAGE

15. LIF SURVEY.....192
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....193
10. MONITORING WELL SAMPLES.....193
20. MISC SAMPLES.....193
60. DEMO/REMOVAL TREATMENT SYSTEM
02. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT.....194
02. ADMINISTRATION HOME OFFICE.....194
03. PURCHASING.....195
06. FIRST AID, FIRE, TRAFFIC, SECUR.....196
07. HEALTH & SAFETY.....196
09. TEMP CONSTRUCTION FACILITIES.....197
10. PROJECT UTILITIES.....198
05. DEMO GWTP.....199
10. DEMO PIPING.....199
15. PLUG & ABANDON WELLS.....199
20. DISPOSALS.....199
3435. 8TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....201
49. SAMPLING & ANALYSIS
10. COMPLIANCE MONITORING
10. PERIMETER MONITORING WELLS.....203
25. SAMPLING TECHNICIANS.....203
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
10. MONITORING WELL SAMPLES.....205

BACKUP REPORTS BACKUP PAGE

CREW BACKUP.....1
LABOR BACKUP.....8
EQUIPMENT BACKUP.....9

* * * END TABLE OF CONTENTS * * *

** PROJECT INDIRECT SUMMARY - ACCOUNT **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS	1.00	JOB	26,667,153	1,600,029	2,826,718	155,470	31,249,370	31249370.23
3400 1ST YEAR O&M	12.00	MO	9,905,686	594,341	1,050,003	57,750	11,607,780	967315.01
3405 2ND YEAR O&M	12.00	MO	9,117,791	547,067	966,486	53,157	10,684,501	890375.09
3410 3RD YEAR O&M	12.00	MO	7,116,885	427,013	754,390	41,491	8,339,779	694981.57
3415 4TH YEAR O&M	12.00	MO	6,285,978	377,159	666,314	36,647	7,366,098	613841.49
3420 5TH YEAR O&M	12.00	MO	2,240,558	134,433	237,499	13,062	2,625,553	218796.06
3425 6TH YEAR O&M	12.00	MO	2,222,862	133,372	235,623	12,959	2,604,817	217068.05
3430 7TH YEAR O&M	12.00	MO	3,656,830	219,410	387,624	21,319	4,285,183	357098.60
3435 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
TOTAL McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	67,308,985	4,038,539	7,134,752	392,411	78,874,688	78874688.42
Scope Contingency	9.61	%					7,576,970	
SUBTOTAL							86,451,658	
Bid Contingency	9.55	%					8,253,247	
TOTAL INCL OWNER COSTS							94,704,906	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
3300.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
3300.12 ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
3300.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	784,065	47,044	83,111	4,571	918,791	918791.45
3300.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	21,127,071	1,267,624	2,239,470	123,171	24,757,336	24757335.59
3300.25 START UP, TESTING, O&M PLAN	1.00	JOB	597,698	35,862	63,356	3,485	700,400	700400.28
3300.30 DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
TOTAL CAPITAL COSTS	1.00	JOB	26,667,153	1,600,029	2,826,718	155,470	31,249,370	31249370.23
Scope Contingency	9.55	%					2,984,839	
SUBTOTAL							34,234,209	
Bid Contingency	9.98	%					3,416,927	
TOTAL INCL OWNER COSTS							37,651,136	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3400.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3400.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3400.25 MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
3400.30 UTILITIES	12.00	MO	7,585,481	455,129	804,061	44,223	8,888,894	740741.13
3400.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3400.40 CHEMICALS	12.00	MO	107,130	6,428	11,356	625	125,538	10461.51
3400.45 DISPOSALS	12.00	MO	291,655	17,499	30,915	1,700	341,770	28480.84
3400.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
3400.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 1ST YEAR O&M	12.00	MO	9,905,686	594,341	1,050,003	57,750	11,607,780	967315.01
Scope Contingency	9.67	%					1,122,045	
SUBTOTAL							12,729,825	
Bid Contingency	9.57	%					1,218,764	
TOTAL INCL OWNER COSTS							13,948,589	
3405 2ND YEAR O&M								
3405. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3405.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3405.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3405.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3405.30 UTILITIES	12.00	MO	6,695,143	401,709	709,685	39,033	7,845,569	653797.40
3405.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3405.40 CHEMICALS	12.00	MO	99,868	5,992	10,586	582	117,028	9752.36
3405.45 DISPOSALS	12.00	MO	292,370	17,542	30,991	1,705	342,608	28550.66
3405.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3405.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
TOTAL 2ND YEAR O&M	12.00	MO	9,117,791	547,067	966,486	53,157	10,684,501	890375.09
Scope Contingency	9.64	%					1,029,717	
SUBTOTAL							11,714,218	
Bid Contingency	9.49	%					1,111,948	
TOTAL INCL OWNER COSTS							12,826,166	
3410 3RD YEAR O&M								
3410. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3410.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3410.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3410.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3410.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3410.30 UTILITIES	12.00	MO	5,097,000	305,820	540,282	29,716	5,972,818	497734.79
3410.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3410.40 CHEMICALS	12.00	MO	86,931	5,216	9,215	507	101,868	8489.03
3410.45 DISPOSALS	12.00	MO	286,419	17,185	30,360	1,670	335,634	27969.53
3410.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3410.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 3RD YEAR O&M	12.00	MO	7,116,885	427,013	754,390	41,491	8,339,779	694981.57
Scope Contingency	9.78	%					815,542	
SUBTOTAL							9,155,321	
Bid Contingency	9.58	%					877,371	
TOTAL INCL OWNER COSTS							10,032,692	
3415 4TH YEAR O&M								
3415. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3415.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3415.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3415.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3415.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3415.30 UTILITIES	12.00	MO	4,262,698	255,762	451,846	24,852	4,995,157	416263.12

** PROJECT INDIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3415.40	CHEMICALS	12.00	MO	70,743	4,245	7,499	412	82,899	6908.23
3415.45	DISPOSALS	12.00	MO	274,793	16,488	29,128	1,602	322,010	26834.17
3415.49	SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3415.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3415.60	REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
	TOTAL 4TH YEAR O&M	12.00	MO	6,285,978	377,159	666,314	36,647	7,366,098	613841.49
	Scope Contingency	9.72	%					716,345	
	SUBTOTAL							8,082,443	
	Bid Contingency	9.53	%					770,083	
	TOTAL INCL OWNER COSTS							8,852,526	
3420	5TH YEAR O&M								
3420. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3420.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3420.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3420.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3420.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3420.30	UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3420.40	CHEMICALS	12.00	MO	55,993	3,360	5,935	326	65,614	5467.86
3420.45	DISPOSALS	12.00	MO	273,678	16,421	29,010	1,596	320,704	26725.29
3420.49	SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3420.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
	TOTAL 5TH YEAR O&M	12.00	MO	2,240,558	134,433	237,499	13,062	2,625,553	218796.06
	Scope Contingency	9.32	%					244,641	
	SUBTOTAL							2,870,194	
	Bid Contingency	8.88	%					254,818	
	TOTAL INCL OWNER COSTS							3,125,012	
3425	6TH YEAR O&M								
3425. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3425.30	UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3425.40	CHEMICALS	12.00	MO	44,820	2,689	4,751	261	52,521	4376.79

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3425.45 DISPOSALS	12.00	MO	267,155	16,029	28,318	1,558	313,060	26088.35
3425.49 SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3425.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL 6TH YEAR O&M	12.00	MO	2,222,862	133,372	235,623	12,959	2,604,817	217068.05
Scope Contingency	9.31	%					242,568	
SUBTOTAL							2,847,384	
Bid Contingency	8.87	%					252,537	
TOTAL INCL OWNER COSTS							3,099,921	
3430 7TH YEAR O&M								
3430. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3430.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3430.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3430.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3430.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3430.30 UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
3430.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3430.40 CHEMICALS	12.00	MO	41,945	2,517	4,446	245	49,152	4096.03
3430.45 DISPOSALS	12.00	MO	265,833	15,950	28,178	1,550	311,510	25959.21
3430.49 SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
3430.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
3430.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
TOTAL 7TH YEAR O&M	12.00	MO	3,656,830	219,410	387,624	21,319	4,285,183	357098.60
Scope Contingency	9.58	%					410,605	
SUBTOTAL							4,695,788	
Bid Contingency	7.34	%					344,686	
TOTAL INCL OWNER COSTS							5,040,474	
3435 8TH YEAR O&M								
3435. 5 GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77
3435.49 SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
3435.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
TOTAL 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
Scope Contingency	9.56	%					10,668	
SUBTOTAL							122,276	
Bid Contingency	5.00	%					6,114	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							128,390	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS								
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1.00	JOB	1,314,235	78,854	139,309	7,662	1,540,060	1540059.88
3300.05.02 ADMINISTRATION HOME OFFICE	1.00	JOB	400,201	24,012	42,421	2,333	468,967	468967.07
3300.05.03 PURCHASING	1.00	JOB	123,860	7,432	13,129	722	145,143	145142.86
3300.05.06 FIRST AID, FIRE, TRAFFIC, SECUR	1.00	JOB	136,647	8,199	14,485	797	160,127	160126.79
3300.05.07 HEALTH & SAFETY	1.00	JOB	72,883	4,373	7,726	425	85,407	85406.83
3300.05.09 TEMP CONSTRUCTION FACILITIES	1.00	JOB	118,810	7,129	12,594	693	139,225	139225.12
3300.05.10 PROJECT UTILITIES	1.00	JOB	18,902	1,134	2,004	110	22,150	22149.70
3300.05.15 PATENT FEES			100,000	6,000	10,600	583	117,183	
TOTAL GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
Scope Contingency	5.00	%					133,913	
SUBTOTAL							2,812,174	
Bid Contingency	10.00	%					281,217	
TOTAL INCL OWNER COSTS							3,093,392	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01 Construction Work Plan	1.00	EA	12,230	734	1,296	71	14,331	14331.01
3300.10.02 Contractors QC Management Plan	1.00	EA	7,302	438	774	43	8,556	8556.23
3300.10.03 Contractors Chem Quality Control	1.00	EA	13,774	826	1,460	80	16,141	16140.79
3300.10.05 Regulatory Compliance Plan/Updat	1.00	EA	38,950	2,337	4,129	227	45,643	45642.78
3300.10.06 Traffic Routing Plan	1.00	EA	1,979	119	210	12	2,319	2318.58
3300.10.07 Site Health and Safety Plan	1.00	EA	11,806	708	1,251	69	13,834	13834.16
3300.10.15 Performance Testing Plan	1.00	EA	10,723	643	1,137	63	12,566	12565.77
3300.10.41 Subcontracting Plan	1.00	EA	2,398	144	254	14	2,811	2810.52
3300.10.42 Environmental Protection Plan	1.00	EA	3,333	200	353	19	3,905	3905.48
3300.10.43 Correct/Emerg Conting Action Pln	1.00	EA	3,064	184	325	18	3,591	3590.96
TOTAL SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
Scope Contingency	5.00	%					6,185	
SUBTOTAL							129,881	
Bid Contingency	5.00	%					6,494	
TOTAL INCL OWNER COSTS							136,375	
3300.12 ENGINEERING								
3300.12.10 COMPLETION DESIGN - CIVIL	1.00	JOB	184,160	11,050	19,521	1,074	215,804	215804.21
3300.12.15 COMPLETION DESIGN - PROCESS	1.00	JOB	430,800	25,848	45,665	2,512	504,824	504824.36

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.12.20	COMPLETION DESIGN - ELECTRICAL	1.00	JOB	98,110	5,887	10,400	572	114,968	114968.24
3300.12.32	COMPLETION DESIGN - MECHANICAL	1.00	JOB	64,180	3,851	6,803	374	75,208	75208.05
3300.12.37	COMPLETE DESIGN - SPECIALTY SUB	1.00	JOB	800,000	48,000	84,800	4,664	937,464	937464.00
	TOTAL ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
	Scope Contingency	10.00	%					188,421	
	SUBTOTAL							2,072,626	
	Bid Contingency	10.00	%					207,263	
	TOTAL INCL OWNER COSTS							2,279,889	
3300.15	MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01	CLEAR SITE BRUSH	30.00	ACR	18,523	1,111	1,963	108	21,706	723.52
3300.15.02	MOBE EQUIP & FACILITIES	1.00	JOB	1,284	77	136	7	1,505	1504.60
3300.15.05	TEMPORARY FACILITIES	1.00	JOB	261,135	15,668	27,680	1,522	306,006	306006.01
3300.15.08	SIGNS, BARRICADES	1.00	JOB	79,554	4,773	8,433	464	93,223	93223.28
3300.15.10	GRAVEL CAP	12.70	ACR	289,212	17,353	30,656	1,686	338,907	26685.62
3300.15.15	ASPHALT CAP	4222.00	SY	93,922	5,635	9,956	548	110,061	26.07
3300.15.92	SURVEYS	1.00	JOB	29,000	1,740	3,074	169	33,983	33983.07
3300.15.97	MEETINGS	2.00	EA	11,435	686	1,212	67	13,400	6700.22
	TOTAL MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	784,065	47,044	83,111	4,571	918,791	918791.45
	Scope Contingency	10.00	%					91,879	
	SUBTOTAL							1,010,671	
	Bid Contingency	10.00	%					101,067	
	TOTAL INCL OWNER COSTS							1,111,738	
3300.20	TREATMENT SYSTEM CONSTRUCTION								
3300.20.01	TREATMENT PLANT BUILDING	1.00	JOB	429,361	25,762	45,512	2,503	503,139	503138.56
3300.20.05	TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	4,768,976	286,139	505,511	27,803	5,588,429	5588428.86
3300.20.07	WELL INSTRUMENTS/CONTROLS	1.00	JOB	2,357,431	141,446	249,888	13,744	2,762,508	2762508.24
3300.20.10	INSTALL WELLS	1.00	JOB	9,124,409	547,465	967,187	53,195	10,692,256	10692255.92
3300.20.15	PIPING	1.00	JOB	4,446,894	266,814	471,371	25,925	5,211,004	5211004.02
	TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	21,127,071	1,267,624	2,239,470	123,171	24,757,336	24757335.59
	Scope Contingency	10.00	%					2,475,734	
	SUBTOTAL							27,233,069	
	Bid Contingency	10.00	%					2,723,307	
	TOTAL INCL OWNER COSTS							29,956,376	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.25 START UP, TESTING, O&M PLAN								
3300.25. 5 O&M MANUAL	1.00	JOB	43,043	2,583	4,563	251	50,439	50438.70
3300.25.10 STARTUP/COMMISSION TREATMENT SYS	1.00	JOB	554,655	33,279	58,793	3,234	649,962	649961.58
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	597,698	35,862	63,356	3,485	700,400	700400.28
Scope Contingency	10.00	%					70,040	
SUBTOTAL							770,440	
Bid Contingency	10.00	%					77,044	
TOTAL INCL OWNER COSTS							847,484	
3300.30 DEMOBILIZATION								
3300.30.21 DEMOBILIZATION	1.00	JOB	14,171	850	1,502	83	16,606	16606.21
3300.30.22 REPORTS, CLOSEOUT	1.00	JOB	145,135	8,708	15,384	846	170,074	170073.78
TOTAL DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
Scope Contingency	10.00	%					18,668	
SUBTOTAL							205,348	
Bid Contingency	10.00	%					20,535	
TOTAL INCL OWNER COSTS							225,883	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS								
3400. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3400. 5.10 ERH SYSTEM OP/REPORTING	12.00	MO	346,424	20,785	36,721	2,020	405,950	33829.17
3400. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
Scope Contingency	5.00	%					34,095	
SUBTOTAL							715,993	
Bid Contingency	5.00	%					35,800	
TOTAL INCL OWNER COSTS							751,793	
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	TOTAL INCL OWNER COSTS							60,101	
3400.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3400.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3400.25	MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
	Scope Contingency	10.00	%					9,384	
	SUBTOTAL							103,224	
	Bid Contingency	10.00	%					10,322	
	TOTAL INCL OWNER COSTS							113,547	
3400.30	UTILITIES	12.00	MO	7,585,481	455,129	804,061	44,223	8,888,894	740741.13
	Scope Contingency	10.00	%					888,889	
	SUBTOTAL							9,777,783	
	Bid Contingency	10.00	%					977,778	
	TOTAL INCL OWNER COSTS							10,755,561	
3400.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3400.40	CHEMICALS	12.00	MO	107,130	6,428	11,356	625	125,538	10461.51
	Scope Contingency	10.00	%					12,554	
	SUBTOTAL							138,092	
	Bid Contingency	10.00	%					13,809	
	TOTAL INCL OWNER COSTS							151,901	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3400.45 DISPOSALS								
3400.45. 5 SLUDGE	12.00	MO	34,200	2,052	3,625	199	40,077	3339.72
3400.45.10 CARBON (GAC, VAPOR PHASE)	12.00	MO	6,240	374	661	36	7,312	609.35
3400.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	18,515	1,111	1,963	108	21,696	1808.04
3400.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3400.45.25 OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3400.45.30 WASTE MISC COSTS	12.00	MO	12,900	774	1,367	75	15,117	1259.72
TOTAL DISPOSALS	12.00	MO	291,655	17,499	30,915	1,700	341,770	28480.84
Scope Contingency	10.00	%					34,177	
SUBTOTAL							375,947	
Bid Contingency	10.00	%					37,595	
TOTAL INCL OWNER COSTS							413,542	
3400.49 SAMPLING & ANALYSIS								
3400.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3400.49.10 COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
Scope Contingency	10.00	%					24,634	
SUBTOTAL							270,970	
Bid Contingency	5.00	%					13,548	
TOTAL INCL OWNER COSTS							284,518	
3400.55 QC & ANALYTICAL DATA VALIDATION								
3400.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	

3405 2ND YEAR O&M

3405. 5 GENERAL CONDITIONS

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405. 5.05	OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3405. 5.10	ERH SYSTEM OP/REPORTING	12.00	MO	346,424	20,785	36,721	2,020	405,950	33829.17
3405. 5.15	SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
	TOTAL GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
	Scope Contingency	5.00	%					34,095	
	SUBTOTAL							715,993	
	Bid Contingency	5.00	%					35,800	
	TOTAL INCL OWNER COSTS							751,793	
3405.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3405.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3405.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3405.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3405.30	UTILITIES	12.00	MO	6,695,143	401,709	709,685	39,033	7,845,569	653797.40
	Scope Contingency	10.00	%					784,557	
	SUBTOTAL							8,630,126	
	Bid Contingency	10.00	%					863,013	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	TOTAL INCL OWNER COSTS							9,493,138	
3405.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3405.40	CHEMICALS	12.00	MO	99,868	5,992	10,586	582	117,028	9752.36
	Scope Contingency	10.00	%					11,703	
	SUBTOTAL							128,731	
	Bid Contingency	10.00	%					12,873	
	TOTAL INCL OWNER COSTS							141,604	
3405.45	DISPOSALS								
3405.45. 5	SLUDGE	12.00	MO	34,200	2,052	3,625	199	40,077	3339.72
3405.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	6,240	374	661	36	7,312	609.35
3405.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	15,870	952	1,682	93	18,597	1549.75
3405.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3405.45.25	OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3405.45.30	WASTE MISC COSTS	12.00	MO	16,260	976	1,724	95	19,054	1587.83
	TOTAL DISPOSALS	12.00	MO	292,370	17,542	30,991	1,705	342,608	28550.66
	Scope Contingency	10.00	%					34,261	
	SUBTOTAL							376,869	
	Bid Contingency	10.00	%					37,687	
	TOTAL INCL OWNER COSTS							414,556	
3405.49	SAMPLING & ANALYSIS								
3405.49. 5	PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3405.49.10	COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
	TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
	Scope Contingency	10.00	%					34,188	
	SUBTOTAL							376,073	
	Bid Contingency	5.00	%					18,804	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							394,877	
3405.55 QC & ANALYTICAL DATA VALIDATION								
3405.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
Scope Contingency	10.00	%					4,389	
SUBTOTAL							48,276	
Bid Contingency	10.00	%					4,828	
TOTAL INCL OWNER COSTS							53,104	
3410 3RD YEAR O&M								
3410. 5 GENERAL CONDITIONS								
3410. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3410. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3410.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3410.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3410.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3410.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3410.30	UTILITIES	12.00	MO	5,097,000	305,820	540,282	29,716	5,972,818	497734.79
	Scope Contingency	10.00	%					597,282	
	SUBTOTAL							6,570,099	
	Bid Contingency	10.00	%					657,010	
	TOTAL INCL OWNER COSTS							7,227,109	
3410.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3410.40	CHEMICALS	12.00	MO	86,931	5,216	9,215	507	101,868	8489.03
	Scope Contingency	10.00	%					10,187	
	SUBTOTAL							112,055	
	Bid Contingency	10.00	%					11,206	
	TOTAL INCL OWNER COSTS							123,261	
3410.45	DISPOSALS								
3410.45. 5	SLUDGE	12.00	MO	34,200	2,052	3,625	199	40,077	3339.72
3410.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	6,240	374	661	36	7,312	609.35

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3410.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	9,919	595	1,051	58	11,623	968.61
3410.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3410.45.25 OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3410.45.30 WASTE MISC COSTS	12.00	MO	16,260	976	1,724	95	19,054	1587.83
TOTAL DISPOSALS	12.00	MO	286,419	17,185	30,360	1,670	335,634	27969.53
Scope Contingency	10.00	%					33,563	
SUBTOTAL							369,198	
Bid Contingency	10.00	%					36,920	
TOTAL INCL OWNER COSTS							406,118	
3410.49 SAMPLING & ANALYSIS								
3410.49. 5 PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3410.49.10 COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
Scope Contingency	10.00	%					34,188	
SUBTOTAL							376,073	
Bid Contingency	5.00	%					18,804	
TOTAL INCL OWNER COSTS							394,877	
3410.55 QC & ANALYTICAL DATA VALIDATION								
3410.55. 5 DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3415 4TH YEAR O&M								
3415. 5 GENERAL CONDITIONS								
3415. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3415. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00	%					13,797	
	SUBTOTAL							289,746	
	Bid Contingency	5.00	%					14,487	
	TOTAL INCL OWNER COSTS							304,233	
3415.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3415.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3415.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3415.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3415.30	UTILITIES	12.00	MO	4,262,698	255,762	451,846	24,852	4,995,157	416263.12
	Scope Contingency	10.00	%					499,516	
	SUBTOTAL							5,494,673	
	Bid Contingency	10.00	%					549,467	
	TOTAL INCL OWNER COSTS							6,044,140	
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3415.40	CHEMICALS	12.00	MO	70,743	4,245	7,499	412	82,899	6908.23
	Scope Contingency	10.00	%					8,290	
	SUBTOTAL							91,189	
	Bid Contingency	10.00	%					9,119	
	TOTAL INCL OWNER COSTS							100,308	
3415.45	DISPOSALS								
3415.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3415.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	3,120	187	331	18	3,656	304.68
3415.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	6,613	397	701	39	7,749	645.73
3415.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3415.45.25	OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3415.45.30	WASTE MISC COSTS	12.00	MO	16,260	976	1,724	95	19,054	1587.83
	TOTAL DISPOSALS	12.00	MO	274,793	16,488	29,128	1,602	322,010	26834.17
	Scope Contingency	10.00	%					32,201	
	SUBTOTAL							354,211	
	Bid Contingency	10.00	%					35,421	
	TOTAL INCL OWNER COSTS							389,632	
3415.49	SAMPLING & ANALYSIS								
3415.49. 5	PERFORMANCE MONITORING	12.00	MO	96,605	5,796	10,240	563	113,205	9433.75
3415.49.10	COMPLIANCE MONITORING	12.00	MO	195,148	11,709	20,686	1,138	228,680	19056.66
	TOTAL SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
	Scope Contingency	10.00	%					34,188	
	SUBTOTAL							376,073	
	Bid Contingency	5.00	%					18,804	
	TOTAL INCL OWNER COSTS							394,877	
3415.55	QC & ANALYTICAL DATA VALIDATION								
3415.55. 5	DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00	%					1,357	
SUBTOTAL							28,504	
Bid Contingency	5.00	%					1,425	
TOTAL INCL OWNER COSTS							29,929	
3415.60 REMOVE/DEMO STEAM EQUIPMENT								
3415.60. 5 DEMOLITION/REMOVAL EQUIPMENT	1.00	JOB	21,210	1,273	2,248	124	24,855	24854.69
3415.60.10 DISPOSALS	1.00	JOB	10,000	600	1,060	58	11,718	11718.30
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
Scope Contingency	5.00	%					1,829	
SUBTOTAL							38,402	
Bid Contingency	10.00	%					3,840	
TOTAL INCL OWNER COSTS							42,242	
3420 5TH YEAR O&M								
3420. 5 GENERAL CONDITIONS								
3420. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3420. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3420.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3420.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3420.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3420.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3420.30	UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
	Scope Contingency	10.00	%					41,861	
	SUBTOTAL							460,468	
	Bid Contingency	10.00	%					46,047	
	TOTAL INCL OWNER COSTS							506,515	
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3420.40	CHEMICALS	12.00	MO	55,993	3,360	5,935	326	65,614	5467.86
	Scope Contingency	10.00	%					6,561	
	SUBTOTAL							72,176	
	Bid Contingency	10.00	%					7,218	
	TOTAL INCL OWNER COSTS							79,393	
3420.45	DISPOSALS								
3420.45. 5	SLUDGE	12.00	MO	34,200	2,052	3,625	199	40,077	3339.72
3420.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	3,968	238	421	23	4,649	387.44

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3420.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3420.45.25 OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3420.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	273,678	16,421	29,010	1,596	320,704	26725.29
Scope Contingency	10.00	%					32,070	
SUBTOTAL							352,774	
Bid Contingency	10.00	%					35,277	
TOTAL INCL OWNER COSTS							388,051	
3420.49 SAMPLING & ANALYSIS								
3420.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3420.49.10 COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00	%					24,349	
SUBTOTAL							267,844	
Bid Contingency	5.00	%					13,392	
TOTAL INCL OWNER COSTS							281,236	
3420.55 QC & ANALYTICAL DATA VALIDATION								
3420.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3425 6TH YEAR O&M								
3425. 5 GENERAL CONDITIONS								
3425. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3425. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00	%					13,797	
	SUBTOTAL							289,746	
	Bid Contingency	5.00	%					14,487	
	TOTAL INCL OWNER COSTS							304,233	
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3425.30	UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
	Scope Contingency	10.00	%					41,861	
	SUBTOTAL							460,468	
	Bid Contingency	10.00	%					46,047	
	TOTAL INCL OWNER COSTS							506,515	
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Bid Contingency	10.00	%					124,577	
TOTAL INCL OWNER COSTS							1,370,344	
3425.40 CHEMICALS	12.00	MO	44,820	2,689	4,751	261	52,521	4376.79
Scope Contingency	10.00	%					5,252	
SUBTOTAL							57,774	
Bid Contingency	10.00	%					5,777	
TOTAL INCL OWNER COSTS							63,551	
3425.45 DISPOSALS								
3425.45. 5 SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3425.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	2,645	159	280	15	3,099	258.29
3425.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3425.45.25 OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3425.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	267,155	16,029	28,318	1,558	313,060	26088.35
Scope Contingency	10.00	%					31,306	
SUBTOTAL							344,366	
Bid Contingency	10.00	%					34,437	
TOTAL INCL OWNER COSTS							378,803	
3425.49 SAMPLING & ANALYSIS								
3425.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3425.49.10 COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00	%					24,349	
SUBTOTAL							267,844	
Bid Contingency	5.00	%					13,392	
TOTAL INCL OWNER COSTS							281,236	
3425.55 QC & ANALYTICAL DATA VALIDATION								
3425.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3430 7TH YEAR O&M								
3430. 5 GENERAL CONDITIONS								
3430. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3430. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00	%					13,797	
SUBTOTAL							289,746	
Bid Contingency	5.00	%					14,487	
TOTAL INCL OWNER COSTS							304,233	
3430.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	
TOTAL INCL OWNER COSTS							60,101	
3430.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00	%					555	
SUBTOTAL							11,664	
Bid Contingency	5.00	%					583	
TOTAL INCL OWNER COSTS							12,248	
3430.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
Scope Contingency	10.00	%					422	
SUBTOTAL							4,640	
Bid Contingency	10.00	%					464	
TOTAL INCL OWNER COSTS							5,104	
3430.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
Scope Contingency	10.00	%					8,212	
SUBTOTAL							90,334	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3430.30	UTILITIES	12.00	MO	357,226	21,434	37,866	2,083	418,608	34883.97
	Scope Contingency	10.00	%					41,861	
	SUBTOTAL							460,468	
	Bid Contingency	10.00	%					46,047	
	TOTAL INCL OWNER COSTS							506,515	
3430.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3430.40	CHEMICALS	12.00	MO	41,945	2,517	4,446	245	49,152	4096.03
	Scope Contingency	10.00	%					4,915	
	SUBTOTAL							54,068	
	Bid Contingency	10.00	%					5,407	
	TOTAL INCL OWNER COSTS							59,474	
3430.45	DISPOSALS								
3430.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3430.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	1,323	79	140	8	1,550	129.15
3430.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3430.45.25	OILY WASTE	12.00	MO	217,800	13,068	23,087	1,270	255,225	21268.71
3430.45.30	WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
	TOTAL DISPOSALS	12.00	MO	265,833	15,950	28,178	1,550	311,510	25959.21
	Scope Contingency	10.00	%					31,151	
	SUBTOTAL							342,662	
	Bid Contingency	10.00	%					34,266	
	TOTAL INCL OWNER COSTS							376,928	
3430.49	SAMPLING & ANALYSIS								
3430.49. 5	PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3430.49.10	COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3430.49.15 CONFIRMATIONAL SAMPLING			71,190	4,271	7,546	415	83,423	
TOTAL SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
Scope Contingency	10.00	%					32,692	
SUBTOTAL							359,609	
Bid Contingency	5.00	%					17,980	
TOTAL INCL OWNER COSTS							377,589	
3430.55 QC & ANALYTICAL DATA VALIDATION								
3430.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3430.60 DEMO/REMOVAL TREATMENT SYSTEM								
3430.60.02 GENERAL CONDITIONS	1.00	JOB	304,080	18,245	32,232	1,773	356,330	356329.68
3430.60.05 DEMO GWTP	1.00	JOB	85,020	5,101	9,012	496	99,629	99628.83
3430.60.10 DEMO PIPING	1.00	JOB	116,770	7,006	12,378	681	136,834	136834.50
3430.60.15 PLUG & ABANDON WELLS	1.00	JOB	261,106	15,666	27,677	1,522	305,972	305971.84
3430.60.20 DISPOSALS	1.00	JOB	600,000	36,000	63,600	3,498	703,098	703098.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
Scope Contingency	10.00	%					160,186	
SUBTOTAL							1,762,049	
Bid Contingency	5.00	%					88,102	
TOTAL INCL OWNER COSTS							1,850,152	
3435 8TH YEAR O&M								
3435. 5 GENERAL CONDITIONS								
3435. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	6,029	362	639	35	7,065	588.77
TOTAL GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00 %					353	
SUBTOTAL						7,418	
Bid Contingency	5.00 %					371	
TOTAL INCL OWNER COSTS						7,789	
3435.49 SAMPLING & ANALYSIS							
3435.49.10 COMPLIANCE MONITORING	12.00 MO	86,837	5,210	9,205	506	101,758	8479.87
TOTAL SAMPLING & ANALYSIS	12.00 MO	86,837	5,210	9,205	506	101,758	8479.87
Scope Contingency	10.00 %					10,176	
SUBTOTAL						111,934	
Bid Contingency	5.00 %					5,597	
TOTAL INCL OWNER COSTS						117,531	
3435.55 QC & ANALYTICAL DATA VALIDATION							
3435.55. 5 DATA VALIDATION	12.00 MO	2,376	143	252	14	2,784	232.02
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	2,376	143	252	14	2,784	232.02
Scope Contingency	5.00 %					139	
SUBTOTAL						2,923	
Bid Contingency	5.00 %					146	
TOTAL INCL OWNER COSTS						3,070	

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300. CAPITAL COSTS								
3300.05. GENERAL CONDITIONS								
3300.05.01. FIELD SUPERVISION & MANAGEMENT								
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	3400.00 HR	227,171	0	0	0	0	227,171	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	3400.00 HR	147,798	0	0	0	0	147,798	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	3400.00 HR	180,642	0	0	0	0	180,642	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	3400.00 HR	65,688	0	0	0	0	65,688	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	3400.00 HR	125,902	0	0	0	0	125,902	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	3400.00 HR	147,798	0	0	0	0	147,798	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	3400.00 HR	174,041	0	0	0	0	174,041	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	6800.00 HR	0	37,400	0	0	0	37,400	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	54.00 MO	0	0	0	0	54,000	54,000	1000.00
for 18 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	2470.00 DAY	0	0	0	0	70,395	70,395	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	120.00 EA	0	0	0	0	60,000	60,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	120.00 EA	0	0	0	0	2,400	2,400	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	60000 MI	0	0	0	0	21,000	21,000	0.35

3300.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	1,069,040	37,400	0	0	207,795	1,314,235	1314234.90
3300.05.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	520.00	HR	53,768	0	0	0	0	53,768	103.40
USR AA Prin. Engineer/Scientist I;			91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	600.00	HR	54,780	0	0	0	0	54,780	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	1250.00	HR	48,125	0	0	0	0	48,125	38.50
USR AA Engineer/Scientist IV -			59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	2400.00	HR	142,560	0	0	0	0	142,560	59.40
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	312.00	HR	32,261	0	0	0	0	32,261	103.40
Health and Safety Manager									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	312.00	HR	32,261	0	0	0	0	32,261	103.40
gr									
USR AA Mileage on Personal Car Pjm			0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	41600	MI	0	0	0	0	12,896	12,896	0.31
s*									
USR AA Lodging; three mo for PjM plu			0.00	0.00	0.00	0.00	80.00	80.00	
s	150.00	DAY	0	0	0	0	12,000	12,000	80.00
additional visits during									
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	150.00	DAY	0	0	0	0	5,700	5,700	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	10.00	EA	0	0	0	0	5,000	5,000	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	10.00	DAY	0	0	0	0	450	450	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	20.00	EA	0	0	0	0	400	400	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	363,755	0	0	0	36,446	400,201	400200.60

3300.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.03. PURCHASING									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	1600.00	HR	116,160	0	0	0	0	116,160	72.60
USR AA Secretary/Clerical IV Home			38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	200.00	HR	7,700	0	0	0	0	7,700	38.50
TOTAL PURCHASING	1.00	JOB	123,860	0	0	0	0	123,860	123860.00
3300.05.06. FIRST AID, FIRE, TRAFFIC, SECUR									
USR AA Security Guard Service 24 hr/			0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00	HR	0	0	0	131,400	0	131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S			56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00	EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower			145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No	1.00	EA	145	1	123	0	0	269	269.19
Additional Copper Piping Etc.									
HTW AA Eye Wash Bowl			126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No	4.00	EA	508	4	661	0	0	1,173	293.21
Additional Copper Piping Etc.									
HTW AA First Aid Kit			0.00	0.00	75.00	0.00	0.00	75.00	
	16.00	EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher			0.00	0.00	150.00	0.00	0.00	150.00	
	2.00	EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00	JOB	1,773	15	3,458	131,400	0	136,647	136646.78
3300.05.07. HEALTH & SAFETY									
USR AA Decon Misc Items			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
USR AA Level C PPE			0.00	0.00	41.00	0.00	0.00	41.00	
	40.00	DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE			0.00	0.00	12.00	0.00	0.00	12.00	
	100.00	DAY	0	0	1,200	0	0	1,200	12.00
USR AA Install/Decon Personnel Decon			192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00	LS	192	1	250	0	0	443	443.30

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	18.00 MO	0	14,400	0	0	0	14,400	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	18.00 MO	0	6,300	0	0	0	6,300	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	18.00 MO	0	7,650	0	0	0	7,650	425.00
USR AA Labor Allowance for Site		120.00	0.00	0.00	0.00	0.00	120.00	
Specific Training	60.00 EA	7,200	0	0	0	0	7,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	60.00 EA	12,000	0	0	0	0	12,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	60.00 EA	0	0	0	21,000	0	21,000	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	19,392	28,351	4,140	21,000	0	72,883	72883.30
3300.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	18.00 MO	0	0	0	0	1,350	1,350	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	18.00 MO	0	0	0	0	7,200	7,200	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	36.00 MO	0	0	0	0	3,060	3,060	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	18.00 MO	0	0	7,200	0	0	7,200	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	18.00 MO	0	10,800	0	0	0	10,800	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	18.00 MO	0	9,000	0	0	0	9,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	18.00 MO	0	1,800	0	0	0	1,800	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	18.00 MO	0	0	0	0	900	900	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	6.00 EA	0	18,000	0	0	0	18,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	3.00 EA	0	0	0	1,800	0	1,800	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00
USR AA COE Software, Primavera Suretrack		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 EA	0	0	500	0	0	500	500.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 EA	0	0	0	10,000	0	10,000	10000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 EA	0	0	0	5,000	0	5,000	5000.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	2.00 EA	0	0	0	10,000	0	10,000	5000.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	44,400	20,700	34,000	19,710	118,810	118810.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	18.00 MO	0	0	0	0	9,000	9,000	500.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	18.00 MO	0	0	0	0	8,100	8,100	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	18.00 MO	0	0	0	1,800	2	1,802	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	1,800	17,102	18,902	18901.80
3300.05.15. PATENT FEES								
USR AA Patent Fee Allowance		0.00	0.00	0.00	100000.00	0.00	100000.00	
	1.00 LS	0	0	0	100,000	0	100,000	100000.00
TOTAL PATENT FEES		0	0	0	100,000	0	100,000	
TOTAL GENERAL CONDITIONS	1.00 JOB	1,577,820	110,166	28,298	288,200	281,053	2,285,537	2285537.37

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10. SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01. Construction Work Plan								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	2.00 HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	24.00 HR	924	0	0	0	0	924	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	60.00 HR	5,082	0	0	0	0	5,082	84.70
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Response to Comments	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
TOTAL Construction Work Plan	1.00 EA	10,930	0	0	100	1,200	12,230	12229.60
3300.10.02. Contractors QC Management Plan								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	48.00 HR	2,851	0	0	0	0	2,851	59.40
USR AA Engineer/Scientist IV; Respon		59.40	0.00	0.00	0.00	0.00	59.40	
se	20.00 HR	1,188	0	0	0	0	1,188	59.40
to Comments								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Contractors QC Management Pla	1.00 EA	6,002	0	0	100	1,200	7,302	7301.60

3300.10.03. Contractors Chem Quality Control
Includes Contractors CQCMP, SAP, FSP, QAPP, Groundwater SAP, Process Liquid SAP.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA Senior Engineer/Scientist II; Project Chemist		72.60	0.00	0.00	0.00	0.00	72.60	
	100.00 HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist II; Project Chemist; Response to comments.		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors Chem Quality Cont	1.00 EA	12,474	0	0	100	1,200	13,774	13774.00

3300.10.05. Regulatory Compliance Plan/Updat
This work includes developing plan, quarterly updates to the plan for 8 quarters, and submitting permit/permit equivalency applications to all relevant federal, state and local agencies.

Permits (equivalencies) building, excavation, utility crossings, well, air emissions, Erosion Control, Stormwater, Electrical, Local permits are anticipated.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	120.00 HR	10,164	0	0	0	0	10,164	84.70
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA Permit Charges Allowance		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.30	0.30	
	880.00	MI	0	0	0	0	264	264	0.30
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	4.00	DAY	0	0	0	0	152	152	38.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Regulatory Compliance Plan/Up	1.00	EA	36,234	0	0	100	2,616	38,950	38950.00
3300.10.06. Traffic Routing Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	24.00	HR	1,426	0	0	0	0	1,426	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	10.00	10.00	
	24.00	EA	0	0	0	0	240	240	10.00
USR AA Mail			0.00	0.00	0.00	5.00	0.00	5.00	
	1.00	EA	0	0	0	5	0	5	5.00
TOTAL Traffic Routing Plan	1.00	EA	1,734	0	0	5	240	1,979	1978.60
3300.10.07. Site Health and Safety Plan Includes Air Monitoring Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	120.00	HR	7,128	0	0	0	0	7,128	59.40
USR AA Engineer/Scientist IV; Respon d to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	32.00	HR	1,901	0	0	0	0	1,901	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	8.00	HR	537	0	0	0	0	537	67.10
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
TOTAL Site Health and Safety Plan	1.00	EA	11,106	0	0	100	600	11,806	11805.60
3300.10.15. Performance Testing Plan Source testing, Boiler and Emissions Control System.									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Senior Engineer/Scientist I; Respond to Comments			67.10	0.00	0.00	0.00	0.00	67.10	
	16.00	HR	1,074	0	0	0	0	1,074	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Performance Testing Plan	1.00	EA	9,473	0	0	50	1,200	10,723	10723.20
3300.10.41. Subcontracting Plan									
USR AA Principal Engineer/Scientist I			103.40	0.00	0.00	0.00	0.00	103.40	
	4.00	HR	414	0	0	0	0	414	103.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA Senior Engineer/Scientist II; Site Superintendant			72.60	0.00	0.00	0.00	0.00	72.60	
	8.00	HR	581	0	0	0	0	581	72.60
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Subcontracting Plan	1.00 EA	1,148	0	0	50	1,200	2,398	2398.40
3300.10.42. Environmental Protection Plan								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	8.00 HR	537	0	0	0	0	537	67.10
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Environmental Protection Plan	1.00 EA	2,033	0	0	100	1,200	3,333	3332.80
3300.10.43. Correct/Emerg Conting Action Pln								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	4.00 HR	268	0	0	0	0	268	67.10
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Correct/Emerg Conting Action	1.00	EA	1,764	0	0	100	1,200	3,064	3064.40
TOTAL SUBMITTALS/IMPLEMENTATION PLA	1.00	JOB	92,897	0	0	805	11,856	105,558	105558.20

3300.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.12. ENGINEERING									
3300.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, steam, and gas lines, drainage, roads and parking.									
USR AA Senior Engineer/Scientist III			79.20	0.00	0.00	0.00	0.00	79.20	
	200.00	HR	15,840	0	0	0	0	15,840	79.20
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	200.00	HR	20,680	0	0	0	0	20,680	103.40
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	800.00	HR	58,080	0	0	0	0	58,080	72.60
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	1200.00	HR	50,160	0	0	0	0	50,160	41.80
USR AA Technician/Analyst IV			33.00	0.00	0.00	0.00	0.00	33.00	
	800.00	HR	26,400	0	0	0	0	26,400	33.00
USR AA ODC's			0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00	LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints			0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00	EA	0	0	0	3,000	0	3,000	3.00
TOTAL COMPLETION DESIGN - CIVIL	1.00	JOB	171,160	0	0	3,000	10,000	184,160	184160.00
3300.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.									
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	1000.00	HR	103,400	0	0	0	0	103,400	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	2000.00	HR	83,600	0	0	0	0	83,600	41.80
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	2000.00	HR	169,400	0	0	0	0	169,400	84.70

3300.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	1000.00	HR	48,400	0	0	0	0	48,400	48.40
USR AA ODC's			0.00	0.00	0.00	0.00	20000.00	20000.00	
	1.00	LS	0	0	0	0	20,000	20,000	20000.00
USR AA Blueprints			0.00	0.00	0.00	3.00	0.00	3.00	
	2000.00	EA	0	0	0	6,000	0	6,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00	JOB	404,800	0	0	6,000	20,000	430,800	430800.00

3300.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	400.00	HR	29,040	0	0	0	0	29,040	72.60
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00	HR	18,260	0	0	0	0	18,260	91.30
Electrical Engineer									
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	100.00	HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist I;			67.10	0.00	0.00	0.00	0.00	67.10	
Electrical Engineer	500.00	HR	33,550	0	0	0	0	33,550	67.10
USR AA ODC's			0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00	LS	0	0	0	0	10,000	10,000	10000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00	JOB	88,110	0	0	0	10,000	98,110	98110.00

3300.12.26. PCS PROGRAMMING - GROUNDWATER

3300.12.26.15. PC PROGRAMMING
Process Control programming of PLC/PCS.

USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I	50.00	HR	4,565	0	0	0	0	4,565	91.30
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	200.00	HR	13,420	0	0	0	0	13,420	67.10

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PC PROGRAMMING	1.00 JOB	18,293	0	0	0	500	18,793	18793.00
3300.12.26.20. MMI PROGRAMMING Program man-machine interface, control panels, displays.								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	140.00 HR	9,394	0	0	0	0	9,394	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL MMI PROGRAMMING	1.00 JOB	11,374	0	0	0	500	11,874	11874.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00 JOB	29,667	0	0	0	1,000	30,667	30667.00
3300.12.32. COMPLETION DESIGN - MECHANICAL Design piping to and from all process equipment, wells, tanks, and instrument requirements, HVAC, building plumbing.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	300.00 HR	12,540	0	0	0	0	12,540	41.80
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	200.00 HR	16,940	0	0	0	0	16,940	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	400.00 HR	19,360	0	0	0	0	19,360	48.40

3300.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL COMPLETION DESIGN - MECHANICA	1.00	JOB	59,180	0	0	0	5,000	64,180	64180.00

3300.12.37. COMPLETE DESIGN - SPECIALTY SUB
Specialty sub for steam and electrical resistance heating remediation systems including instrumentation, thermodynamics, estimates of waste removal and rate of heating, cooling, and waste removal rates. Systems may include steam injection, electrical resistance heating and related instrumentation and controls.

USR AA Completion Design from			0.00	0.00	0.00	800000.00	0.00	800000.00	
Conceptual to Bid Package	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL COMPLETE DESIGN - SPECIALTY S	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL ENGINEERING	1.00	JOB	752,917	0	0	809,000	46,000	1,607,917	1607917.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15. MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01. CLEAR SITE BRUSH								
L AIR AA Clearing - Medium Brush w/o G		414.45	202.98	0.00	0.00	0.00	617.43	
rub	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
TOTAL CLEAR SITE BRUSH	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
3300.15.02. MOBE EQUIP & FACILITIES								
USR PL Mobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,284	1,284	256.80
TOTAL MOBE EQUIP & FACILITIES	1.00 JOB	0	0	0	0	1,284	1,284	1283.98
3300.15.05. TEMPORARY FACILITIES								
3300.15.05.20. TEMPORARY PAVING								
Paving at site offices and equipment building.								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
M MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	45.00	0.00	0.00	180.94	
se	13.00 TON	1,800	469	751	0	0	3,020	232.32
3954#/CY (2349Kg/M3),Ctrl Plant								
M MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	45.00	0.00	0.00	180.94	
e	13.00 TON	1,800	469	751	0	0	3,020	232.32
3774#/CY (2242Kg/M3),Ctrl Plant								
M CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	1.00	0.00	0.00	3.30	
Coal Tar Emulsion	120.00 SY	251	104	154	0	0	509	4.24
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL TEMPORARY PAVING		6,168	2,242	1,880	0	0	10,291	

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.05.25. WATER LINE									
Water line for site offices and for required process water.									
M MIL PL 4" (10cm) Galv Steel Pipe			23.72	0.24	8.00	0.00	0.00	31.96	
ASTM A-53, T&C, Sch 40	1000.00	LF	30,450	307	10,272	0	0	41,030	41.03
M MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00	EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4" 45 Degree Ell, 150# MI Gal			52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00	EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4"Coupling,Straight 150# MI G			52.37	0.53	60.00	0.00	0.00	112.90	
alv	10.00	EA	672	7	770	0	0	1,450	144.96
M MIL PL 4"Nipple,Galv Stl Sch 40, 4"			17.96	0.18	20.00	0.00	0.00	38.14	
4"(10cm) Long	10.00	EA	231	2	257	0	0	490	48.97
M MIL PL 4" Iron Body Gate Valve, Thrd			84.65	0.71	800.00	0.00	0.00	885.36	
125# Bronze Mtd w/Threaded Va	1.00	EA	109	1	1,027	0	0	1,137	1136.78
lve									
M MIL PL 4"IB Swing Ck Vlv,Brz,Flg&125			195.19	1.79	400.00	0.00	0.00	596.98	
#	1.00	EA	251	2	514	0	0	767	766.50
M MIL PL 4" Flanged Backflow Preventer			183.48	1.68	3000.00	0.00	0.00	3185.16	
w/2Gate&2CK Vlv&Auto Dif Rlf	1.00	EA	236	2	3,852	0	0	4,090	4089.66
Vlv									
USR PL Piping Bend Thrust Blocks			22.50	0.39	8.00	0.00	0.00	30.89	
	10.00	EA	289	5	103	0	0	397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi			634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00	EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi			0.29	0.00	0.04	0.00	0.00	0.33	
de	1000.00	LF	367	1	51	0	0	420	0.42
(15cm)									
USR PL Chlorinate Water Line			126.97	1.07	50.00	0.00	0.00	178.04	
	1.00	JOB	163	1	64	0	0	229	228.60
MIL PL 4" Standard Fire Hydrant			359.13	3.62	927.18	0.00	0.00	1289.93	
One Piece w/5'(1.5M)Burial Se	2.00	EA	922	9	2,381	0	0	3,312	1656.24
cti									

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL Trench 1/2 CY Hyd Exc, Hvy Soil		1.88	0.83	0.00	0.00	0.00	2.71	
51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loader		1.09	0.46	0.00	0.00	0.00	1.55	
Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Plate		2.86	0.07	0.00	0.00	0.00	2.92	
(15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
TOTAL WATER LINE		38,549	942	21,474	0	0	60,965	
3300.15.05.30. PHONE								
USR AA Install Telephone Service		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PHONE		0	0	0	2,000	0	2,000	
3300.15.05.35. SEWER								
8" sewer, manholes and cleanouts for treated water discharge to POTW and for sanitary waste from offices.								
AIR PL 8" (20CM) Pipe Sch 40		8.98	0.09	6.28	0.00	0.00	15.35	
	1000.00 FT	11,528	116	8,063	0	0	19,707	19.71
AIR PL 8" ABS-PVC (1/4 Bend)		39.28	0.40	64.19	0.00	0.00	103.87	
	10.00 EA	504	5	824	0	0	1,334	133.36
AIR PL 8" ABS-PVC (1/8 Bend)		39.28	0.40	51.18	0.00	0.00	90.86	
	10.00 EA	504	5	657	0	0	1,167	116.66
AIR PL 8" ABS-PVC Wye, Standard		52.37	0.53	40.00	0.00	0.00	92.90	
	10.00 EA	672	7	514	0	0	1,193	119.28
AIR PL 8" ABS-PVC Clean Out Tee w/Plug		165.05	1.90	109.00	0.00	0.00	275.96	
	10.00 EA	2,119	24	1,400	0	0	3,543	354.32
MIL PL 4'Dia x 6'Deep Precast Manhole		381.35	48.51	233.65	0.00	0.00	663.51	
8"(20cm)Tk, (1.2M)Dia x (1.8M)Dp	4.00 EA	1,959	249	1,200	0	0	3,408	851.93
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL SEWER		21,461	1,003	12,812	25,680	0	60,955	
3300.15.05.40. ELECTRICAL SERVICE								
USR AA Install New 480 3PH Service		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 JOB	0	0	0	20,000	0	20,000	20000.00
TOTAL ELECTRICAL SERVICE		0	0	0	20,000	0	20,000	
3300.15.05.45. GAS SERVICE								
Gas service to provide boiler gas and temporary heating of buildings if needed.								
M MIL PL 8"Dia Sched 40 Stl Gas Dist L		16.69	3.99	15.00	0.00	0.00	35.68	
ine (20cm)Dia Plain End, Tar Coated	1000.00 LF	21,429	5,129	19,260	0	0	45,818	45.82
MIL PL 12",150,000 CF/Hr Gas Turb Me		1142.67	11.53	20054.00	0.00	0.00	21208.20	
ter 175 PSI, Direct Digital, Flanged	1.00 EA	1,467	15	25,749	0	0	27,231	27230.80
B MIL PL 8"(10cm) Gas Pressure Regulat		458.69	4.21	1200.00	0.00	0.00	1662.90	
or Flanged End	1.00 EA	589	5	1,541	0	0	2,135	2135.12

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
B MIL PL 8" Iron Body Gate Valve, Gas		628.47	6.34	1200.00	0.00	0.00	1834.81	
Service	1.00 EA	807	8	1,541	0	0	2,356	2355.85
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL GAS SERVICE		27,362	5,741	48,141	25,680	0	106,925	
TOTAL TEMPORARY FACILITIES	1.00 JOB	93,540	9,928	84,307	73,359	0	261,135	261135.16
3300.15.08. SIGNS, BARRICADES								
3300.15.08. 5. SIGNS								
USR AA Jobsite Signs		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
USR AA Hazard Warning Signs		0.00	0.00	0.00	1000.00	0.00	1000.00	
	1.00 LS	0	0	0	1,000	0	1,000	1000.00
TOTAL SIGNS	20.00 EA	0	0	0	3,000	0	3,000	150.00
3300.15.08.10. BARRICADES/TEMP FENCING								
CIV AA Stl Post, 10'OC f/4' Snow Fen		2.05	0.03	0.99	0.00	0.00	3.07	
ce	400.00 LF	822	10	396	0	0	1,227	3.07
TOTAL BARRICADES/TEMP FENCING	1.00 JOB	822	10	396	0	0	1,227	1227.36

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.08.15. EROSION CONTROL									
Assume silt fence on downstream side of all trenches and building excavations.									
MIL AA Silt Fences, Vinyl, 3' High			2.05	0.01	1.22	0.00	0.00	3.28	
With 7.5' Posts	4000.00	LF	8,211	36	4,880	0	0	13,127	3.28
MIL AA TRENCHR,CHN, 24"DP,6"W,WLK-BE			0.00	2.08	0.00	0.00	0.00	2.08	
HND	32.00	HR	0	67	0	0	0	67	2.08
USR AA Silt Fence Removal			0.96	0.00	0.00	0.00	0.00	0.97	
	4000.00	LF	3,849	17	0	0	0	3,866	0.97
USR AA Silt Fence Disposal (Dumpster			0.00	0.00	0.00	0.00	0.25	0.25	
)	4000.00	LF	0	0	0	0	1,000	1,000	0.25
MIL AA Foreman			38.89	0.00	0.00	0.00	0.00	38.89	
	32.00	HR	1,244	0	0	0	0	1,244	38.89
USR AA Maintain Silt Fences			38.39	0.00	0.00	0.00	0.00	38.39	
	80.00	HR	3,071	0	0	0	0	3,071	38.39
USR AA Dump Truck and Driver			0.00	0.00	0.00	50.00	0.00	50.00	
	16.00	HR	0	0	0	800	0	800	50.00
TOTAL EROSION CONTROL	1.00	JOB	16,376	119	4,880	800	1,000	23,175	23174.96
3300.15.08.20. STREET CLEANING									
MIL AA Skid Loader (Bobcat) w/Sweepe			0.00	17.93	0.00	0.00	0.00	17.93	
r Attachment	120.00	HR	0	2,151	0	0	0	2,151	17.93
TOTAL STREET CLEANING	1.00	JOB	0	2,151	0	0	0	2,151	2151.26
3300.15.08.25. DUST CONTROL									
MIL AA Water Truck			0.00	0.00	0.00	50.00	0.00	50.00	
	1000.00	HR	0	0	0	50,000	0	50,000	50.00
TOTAL DUST CONTROL	1.00	JOB	0	0	0	50,000	0	50,000	50000.00
TOTAL SIGNS, BARRICADES	1.00	JOB	17,197	2,281	5,276	53,800	1,000	79,554	79553.58

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.10. GRAVEL CAP Gravel cap for working surface is 552,557 sqft and 6" thick.								
L MIL AA Gravel Surfacing, Delivered		0.73	1.21	19.79	0.00	0.00	21.74	
	13302 CY	9,772	16,155	263,285	0	0	289,212	21.74
TOTAL GRAVEL CAP	12.70 ACR	9,772	16,155	263,285	0	0	289,212	22772.61
3300.15.15. ASPHALT CAP Asphalt cap is 4" of bituminous concrete surfacing over gravel subbase and covers 38,000 sft in part of CPA.								
MIL PV Crushed Stone Paving, Large A		1.54	0.47	0.34	0.00	0.00	2.35	
rea	4222.00 SY	8,363	2,568	1,820	0	0	12,752	3.02
Prepare and Roll Subbase								
B MIL PV Bituminous Hot Mix Intrm Cour		35.94	9.37	45.00	0.00	0.00	90.31	
se	700.00 TON	32,303	8,422	40,445	0	0	81,171	115.96
3954#/CY (2349Kg/M3),Ctrl Plant								
TOTAL ASPHALT CAP	4222.00 SY	40,667	10,990	42,266	0	0	93,922	22.25
3300.15.92. SURVEYS								
3300.15.92. 5. INITIAL LAYOUT SURVEY								
USR AA Survey Pipelines		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
USR AA General Survey for Controls		0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00 DAY	0	0	0	10,000	0	10,000	1000.00
USR AA Survey Report and Plots		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Facility Layout Survey		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL INITIAL LAYOUT SURVEY	1.00 JOB	0	0	0	24,000	0	24,000	24000.00
3300.15.92.10. SURVEY CONTROLS Controls & QC check during construction								
USR AA Survey Crew, 3 man		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL SURVEY CONTROLS	1.00 JOB	0	0	0	5,000	0	5,000	5000.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SURVEYS	1.00	JOB	0	0	0	29,000	0	29,000	29000.00
3300.15.97. MEETINGS									
3300.15.97.01. Preconstruction Meeting									
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	16.00	HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist III; Lead Engineer			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	10.00	HR	913	0	0	0	0	913	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	400.00	MI	0	0	0	0	140	140	0.35
USR AA M&IE; 3 each for 1/2 day and 1 for full day =2.5 days			0.00	0.00	0.00	0.00	42.00	42.00	
	2.50	DAY	0	0	0	0	105	105	42.00
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	1.00	EA	0	0	0	0	500	500	500.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Parking Airports			0.00	0.00	0.00	0.00	10.00	10.00	
	1.00	EA	0	0	0	0	10	10	10.00
USR AA Lodging			0.00	0.00	0.00	0.00	76.00	76.00	
	1.00	DAY	0	0	0	0	76	76	76.00
TOTAL Preconstruction Meeting	1.00	JOB	5,072	0	0	0	969	6,041	6040.88

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.97.03. Coordination Meeting									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	16.00	HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	160.00	MI	0	0	0	0	56	56	0.35
USR AA M&IE; 3 each for 1/2 day and			0.00	0.00	0.00	0.00	42.00	42.00	
1	2.50	DAY	0	0	0	0	105	105	42.00
for full day =2.5 days									
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	4.00	EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Parking Airports			0.00	0.00	0.00	0.00	10.00	10.00	
	1.00	EA	0	0	0	0	10	10	10.00
USR AA Lodging			0.00	0.00	0.00	0.00	76.00	76.00	
	1.00	DAY	0	0	0	0	76	76	76.00
TOTAL Coordination Meeting	1.00	JOB	3,010	0	0	0	2,385	5,395	5394.60
TOTAL MEETINGS	2.00	EA	8,081	0	0	0	3,354	11,435	5717.74
TOTAL MOBE, SITE WORK, TEMP FACILIT	1.00	JOB	181,691	45,444	395,134	156,159	5,638	784,065	784065.48

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20. TREATMENT SYSTEM CONSTRUCTION								
3300.20.01. TREATMENT PLANT BUILDING Steam Generation and GW treatment plant housed in temporary building (Sprung or Rubb type building) sized 200 ft x 100 ft. Assume air conditioned office to house computers and system controls equipment and operators. Building includes concrete slab. Demolition of these structures assumed after cool down and completion of groundwater pumping.								
USR AA Concrete		0.00	0.00	0.00	250.00	0.00	250.00	
	814.00 CY	0	0	0	203,500	0	203,500	250.00
USR AA Rubb Tent 200 x 100		0.00	0.00	0.00	10.00	0.00	10.00	
	22000 SFT	0	0	0	220,000	0	220,000	10.00
MIL AA Structural Fill		5.09	1.76	19.79	0.00	0.00	26.64	
	220.00 CY	1,119	388	4,354	0	0	5,861	26.64
TOTAL TREATMENT PLANT BUILDING	1.00 JOB	1,119	388	4,354	423,500	0	429,361	429361.39
3300.20.05. TREATMENT SYSTEM EQUIP. F&I								
3300.20.05. 5. EXPEDITOR/QC EQUIP. FABRICATION								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
-	200.00 HR	14,520	0	0	0	0	14,520	72.60
Starup/Proveout Project Manager								
USR AA Per Diem/M&IE		0.00	0.00	0.00	0.00	150.00	150.00	
	20.00 DAY	0	0	0	0	3,000	3,000	150.00
USR AA Airfare Trips		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	20.00 DAY	0	0	0	0	900	900	45.00
USR AA Taxi/Limo		0.00	0.00	0.00	0.00	20.00	20.00	
	4.00 EA	0	0	0	0	80	80	20.00
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00 JOB	14,520	0	0	0	5,980	20,500	20500.00
3300.20.05.01. EQUIP SUBMITTAL REVIEW								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	100.00 HR	10,340	0	0	0	0	10,340	103.40
ana								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	600.00	HR	35,640	0	0	0	0	35,640	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Blueprints			0.00	0.00	0.00	3.00	0.00	3.00	
	500.00	EA	0	0	0	1,500	0	1,500	3.00
USR AA Mail			0.00	0.00	0.00	12.00	0.00	12.00	
	50.00	EA	0	0	0	600	0	600	12.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00	JOB	47,520	0	0	2,100	0	49,620	49620.00
3300.20.05.10. EQUIPMENT PURCHASE/SHIPPING									
USR AA 21000 Gal Tank; Fresh water,			0.00	0.00	25000.00	0.00	0.00	25000.00	
Coelescing surge, Boiler surg e.	3.00	LS	0	0	75,000	0	0	75,000	25000.00
USR AA Oil Skimmer System			0.00	0.00	3500.00	0.00	0.00	3500.00	
	1.00	LS	0	0	3,500	0	0	3,500	3500.00
USR AA Water Softeners, (Waste to			0.00	0.00	120000.00	0.00	0.00	120000.00	
POTW)	1.00	LS	0	0	120,000	0	0	120,000	120000.00
USR AA Water Softener Backwash Sludg			0.00	0.00	5000.00	0.00	0.00	5000.00	
e	1.00	LS	0	0	5,000	0	0	5,000	5000.00
Collector Tank; Waste Salt									
USR AA 10,000 Gal Waste Salt Tank			0.00	0.00	12000.00	0.00	0.00	12000.00	
	1.00	LS	0	0	12,000	0	0	12,000	12000.00
USR AA Steam Boiler			0.00	0.00	275000.00	0.00	0.00	275000.00	
	3.00	LS	0	0	825,000	0	0	825,000	275000.00
USR AA CEMS System for Boiler Stack			0.00	0.00	75000.00	0.00	0.00	75000.00	
	3.00	EA	0	0	225,000	0	0	225,000	75000.00
USR AA Cogen Elec Generator (Steam			0.00	0.00	75000.00	0.00	0.00	75000.00	
Turbine)	6.00	EA	0	0	450,000	0	0	450,000	75000.00
USR AA Heat Exchanger Condensor			0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00	LS	0	0	30,000	0	0	30,000	30000.00
USR AA Liquid/Vapor Separator			0.00	0.00	6000.00	0.00	0.00	6000.00	
	1.00	LS	0	0	6,000	0	0	6,000	6000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Vacuum Pump		0.00	0.00	120000.00	0.00	0.00	120000.00	
piping skid; butterfly valves; flexible piping; camlock connections complete.	1.00 LS	0	0	120,000	0	0	120,000	120000.00
USR AA Liquid Separator		0.00	0.00	12000.00	0.00	0.00	12000.00	
	1.00 LS	0	0	12,000	0	0	12,000	12000.00
USR AA Air Dryer		0.00	0.00	45000.00	0.00	0.00	45000.00	
	1.00 LS	0	0	45,000	0	0	45,000	45000.00
USR AA Freight		0.00	0.00	80000.00	0.00	0.00	80000.00	
	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA Heat Exchanger, Liquids from Extraction Wells		0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00 EA	0	0	40,000	0	0	40,000	40000.00
USR AA Liquid Cooling Tower		0.00	0.00	35000.00	0.00	0.00	35000.00	
	1.00 LS	0	0	35,000	0	0	35,000	35000.00
USR AA pH Adjust System		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Solids Holding Bin for Filter		0.00	0.00	5000.00	0.00	0.00	5000.00	
	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Flocculation System		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Coelescing Separator		0.00	0.00	180000.00	0.00	0.00	180000.00	
	1.00 LS	0	0	180,000	0	0	180,000	180000.00
USR AA IAF Separator		0.00	0.00	180000.00	0.00	0.00	180000.00	
	1.00 LS	0	0	180,000	0	0	180,000	180000.00
USR AA 40,000 Waste Water Holding Ta nk; Cone Bottom w/Skirts		0.00	0.00	50000.00	0.00	0.00	50000.00	
	1.00 LS	0	0	50,000	0	0	50,000	50000.00
USR AA Steam Regenerated Carbon Syst em (Vapor Ph)		0.00	0.00	180000.00	0.00	0.00	180000.00	
	1.00 LS	0	0	180,000	0	0	180,000	180000.00
USR AA Carbon Polishing Vessels (Vap or Phase)		0.00	0.00	15000.00	0.00	0.00	15000.00	
	1.00 LS	0	0	15,000	0	0	15,000	15000.00
USR AA Multi Media Vessels		0.00	0.00	25000.00	0.00	0.00	25000.00	
	2.00 LS	0	0	50,000	0	0	50,000	25000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Steam Regenerated GAC System		0.00	0.00	25000.00	0.00	0.00	25000.00	
(Liquid Phase)	2.00 LS	0	0	50,000	0	0	50,000	25000.00
USR AA 800 SCFM Air Compressor with		0.00	0.00	60000.00	0.00	0.00	60000.00	
Dryer	1.00 LS	0	0	60,000	0	0	60,000	60000.00
USR AA Misc. Pumps, Valves, Fittings		0.00	0.00	125000.00	0.00	0.00	125000.00	
,	1.00 LS	0	0	125,000	0	0	125,000	125000.00
Conveyance Pipe & Instruments								
USR AA Spare Parts		0.00	0.00	120000.00	0.00	0.00	120000.00	
	1.00 LS	0	0	120,000	0	0	120,000	120000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Initital Chemical Supply		0.00	0.00	25000.00	0.00	0.00	25000.00	
	1.00 LS	0	0	25,000	0	0	25,000	25000.00
TOTAL EQUIPMENT PURCHASE/SHIPPING	1.00 JOB	0	0	3,141,500	0	0	3,141,500	3141500.00
3300.20.05.12. INSTRUMENTATION/CONTROLLERS								
USR AA I/O and Cabinet		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Software and Processors		0.00	0.00	25000.00	0.00	0.00	25000.00	
	1.00 LS	0	0	25,000	0	0	25,000	25000.00
USR AA Autodailer		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	575.00 HR	52,498	0	0	0	0	52,498	91.30
Instrument Engineer								
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	60.00 HR	4,356	0	0	0	0	4,356	72.60
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	600.00 HR	43,560	0	0	0	0	43,560	72.60
TOTAL INSTRUMENTATION/CONTROLLERS	1.00 JOB	100,414	0	56,000	0	0	156,414	156413.50

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.13. COMPUTER									
USR AA Computer			0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00	EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software			0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00	EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support Plan			0.00	0.00	0.00	450.00	0.00	450.00	
	1.00	YR	0	0	0	450	0	450	450.00
USR AA Software Training			0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00	LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II; O&M Project Manager			72.60	0.00	0.00	0.00	0.00	72.60	
	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist III			79.20	0.00	0.00	0.00	0.00	79.20	
	40.00	HR	3,168	0	0	0	0	3,168	79.20
TOTAL COMPUTER	1.00	JOB	6,072	0	5,300	4,450	0	15,822	15822.00
3300.20.05.15. EQUIPMENT INSTALLATION									
USR AA Crane Rental			0.00	0.00	0.00	4000.00	0.00	4000.00	
	2.00	WK	0	0	0	8,000	0	8,000	4000.00
USR AA Materials/Grout/Misc			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	JOB	0	0	20,000	0	0	20,000	20000.00
MIL AA Eq Oper, Medium			56.51	0.00	0.00	0.00	0.00	56.51	
	280.00	HR	15,821	0	0	0	0	15,821	56.51
MIL AA Laborer (Semi-Skilled)			38.39	0.00	0.00	0.00	0.00	38.39	
	720.00	HR	27,641	0	0	0	0	27,641	38.39
UPB AA FORK LIFT,R/T 8,000#,16.00'L -HT			0.00	11.94	0.00	0.00	0.00	11.94	
	200.00	HR	0	2,388	0	0	0	2,388	11.94
TOTAL EQUIPMENT INSTALLATION	1.00	JOB	43,462	2,388	20,000	8,000	0	73,850	73850.29
3300.20.05.16. TREATMENT SYSTEM ELECTRICAL & IN									
USR AA Electrical/Instrumentation Allowance			0.00	0.00	320000.00	0.00	0.00	320000.00	
	1.00	LS	0	0	320,000	0	0	320,000	320000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00	JOB	0	0	320,000	0	0	320,000	320000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.17. MECHANICAL									
USR AA Mechanical Subcontractor Pipi			0.00	0.00	0.00	25000.00	0.00	25000.00	
ng	1.00	JOB	0	0	0	25,000	0	25,000	25000.00
GW Treatment/Steam Systems									
USR AA Plumbing Building			0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00	JOB	0	0	0	15,000	0	15,000	15000.00
USR AA HVAC			0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00	JOB	0	0	0	15,000	0	15,000	15000.00
TOTAL MECHANICAL	1.00	JOB	0	0	0	55,000	0	55,000	55000.00
3300.20.05.20. SPH 6Ph HEATING COMPONENTS									
See backup for costs per Greg Beyke of Thermal Remediation Systems dated 6/14/01 Materials include cable, graphite, steel shot, shiipping, hydrating solution, Electrodes, Electrode liquid conduit, and Electrode heads.									
USR AA Electrodes Materials & Shippi			0.00	0.00	3182.61	0.00	0.00	3182.61	
ng	36.00	EA	0	0	114,574	0	0	114,574	3182.61
USR AA Power Control System for			0.00	0.00	0.00	600485.00	0.00	600485.00	
Electrodes Purchase & Mobe	1.00	EA	0	0	0	600,485	0	600,485	600485.00
USR AA Power Control System Salvage			0.00	0.00	-87975.00	0.00	0.00	-87975.00	
Value	1.00	EA	0	0	-87,975	0	0	-87,975	-87975.00
USR AA Abovegrade Cables & ERH Syste			0.00	0.00	1187.00	0.00	0.00	1187.00	
m	36.00	EA	0	0	42,732	0	0	42,732	1187.00
Materials									
USR AA Cable Salvage Value			0.00	0.00	-9146.00	0.00	0.00	-9146.00	
	1.00	EA	0	0	-9,146	0	0	-9,146	-9146.00
USR AA TRS On-Site Installation			0.00	0.00	0.00	106.00	0.00	106.00	
Training/Supervision	80.00	HR	0	0	0	8,480	0	8,480	106.00
USR AA TRS Travel/Per Diems			0.00	0.00	0.00	10900.00	0.00	10900.00	
	1.00	LS	0	0	0	10,900	0	10,900	10900.00
USR AA TRS Sr. Project Manager			0.00	0.00	0.00	133.00	0.00	133.00	
	54.00	HR	0	0	0	7,182	0	7,182	133.00
USR AA Electrode Connection Labor			0.00	0.00	0.00	101.00	0.00	101.00	
	100.00	HR	0	0	0	10,100	0	10,100	101.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCS Testing		0.00	0.00	0.00	106.00	0.00	106.00	
	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA Supervising Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	6.00 HR	0	0	0	858	0	858	143.00
TOTAL SPH 6Ph HEATING COMPONENTS	1.00 JOB	0	0	60,185	646,485	0	706,670	706669.96
3300.20.05.25. VEA & DPT COMPONENTS								
USR AA Electrode Arrays		0.00	0.00	15.00	0.00	0.00	15.00	
	9120.00 LFT	0	0	136,800	0	0	136,800	15.00
USR AA Data Collection Equipment		0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Fiber Optic Cable		0.00	0.00	2.50	0.00	0.00	2.50	
	9120.00 LFT	0	0	22,800	0	0	22,800	2.50
TOTAL VEA & DPT COMPONENTS	1.00 JOB	0	0	229,600	0	0	229,600	229600.00
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00 JOB	211,988	2,388	3,832,585	716,035	5,980	4,768,976	4768975.75
3300.20.07. WELL INSTRUMENTS/CONTROLS								
3300.20.07.10. INSTRUMENT CABLE TO WELLHEADS								
MIL EL 6" Stl Cable Tray-Strt Sect,1		6.73	0.03	5.91	0.00	0.00	12.67	
2'	2200.00 LF	19,023	76	16,689	0	0	35,788	16.27
(15cm)w/ hangers & Supports								
L MIL EL 12"Stl Cable Tray-Strt Sect,1		2.25	0.01	6.25	0.00	0.00	8.52	
2'	10000 LF	28,913	116	80,305	0	0	109,333	10.93
(31cm)w/ hangers & Supports								
MIL EL 12"(31cm)Horz 90,Stl Cable Tr		79.01	0.32	38.68	0.00	0.00	118.01	
ay	30.00 EA	3,043	12	1,490	0	0	4,546	151.52
MIL EL 12"(31cm)Horz "T",Stl Cable T		166.80	0.67	70.24	0.00	0.00	237.71	
ray	198.00 EA	42,404	170	17,857	0	0	60,432	305.21
MIL EL 12"-6" Reducer,Steel Cable Tr		52.60	0.21	29.44	0.00	0.00	82.25	
ay	198.00 EA	13,371	54	7,485	0	0	20,910	105.61

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR EL Signal Wire			60.05	0.24	20.00	0.00	0.00	80.29	
	2500.00	KLF	192,748	773	64,199	0	0	257,719	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00	JOB	299,502	1,200	188,025	0	0	488,727	488727.32
3300.20.07.30. WELL INSTRUMENTATION									
USR AA Level Controller			63.49	0.57	600.00	0.00	0.00	664.05	
	140.00	EA	8,888	79	84,000	0	0	92,967	664.05
USR AA Pressure Indicator			63.49	0.57	1000.00	0.00	0.00	1064.05	
	330.00	EA	20,950	187	330,000	0	0	351,137	1064.05
USR AA Temperature Indicator			63.49	0.57	500.00	0.00	0.00	564.05	
	373.00	EA	23,680	211	186,500	0	0	210,391	564.05
USR AA Steam Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	198.00	EA	25,140	224	297,000	0	0	322,364	1628.10
USR AA Water Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	6.00	EA	762	7	9,000	0	0	9,769	1628.10
USR AA Vapor Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	133.00	EA	16,887	150	199,500	0	0	216,538	1628.10
USR AA Amperage Meter			126.97	1.13	500.00	0.00	0.00	628.10	
	36.00	EA	4,571	41	18,000	0	0	22,612	628.10
TOTAL WELL INSTRUMENTATION	1.00	JOB	100,879	898	1,124,000	0	0	1,225,777	1225776.76
3300.20.07.35. VERTICAL ELECTRODE ARRAYS									
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	40.00	0.00	40.00	
Grouting, Vertical	9120.00	LFT	0	0	0	364,800	0	364,800	40.00
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	50.00	0.00	50.00	
Grouting, Horizontal in Sloug h	2600.00	LFT	0	0	0	130,000	0	130,000	50.00
USR AA Horizontal Drill Subcontracto			0.00	0.00	0.00	100.00	0.00	100.00	
r Mobe/Demobe	1.00	LS	0	0	0	100	0	100	100.00
TOTAL VERTICAL ELECTRODE ARRAYS	38.00	EA	0	0	0	494,900	0	494,900	13023.68

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.07.40. ELECTRICAL POWER TO WELLS								
AIR EL 2" R.S. Conduit w/Coupling &		6.65	0.03	2.03	0.00	0.00	8.71	
Supp.	3200.00 LF	27,304	124	8,341	0	0	35,769	11.18
AIR EL 3" R.S. Conduit w/Coupling &		7.31	0.03	4.10	0.00	0.00	11.44	
Supp.	3200.00 LF	30,035	136	16,846	0	0	47,017	14.69
AIR EL 1" R.S. Conduit w/Coupling &		4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	3200.00 LF	17,191	78	3,903	0	0	21,173	6.62
CIV EL 1/4" Nylon Pull Cord Installe		0.29	0.00	0.39	0.00	0.00	0.68	
d	32000 LF	11,841	49	15,897	0	0	27,787	0.87
Cable Installation Methods								
MIL EL No 12-Type THWN		159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12	12.00 MLF	2,455	11	1,184	0	0	3,650	304.13
'Hg								
MIL EL No 8-Type THWN		264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12	12.00 MLF	4,074	19	3,538	0	0	7,631	635.88
'Hg								
MIL EL No 10-Type THWN		200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12	12.00 MLF	3,088	14	1,899	0	0	5,001	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00 JOB	95,988	432	51,607	0	0	148,027	148026.81
TOTAL WELL INSTRUMENTS/CONTROLS	1.00 JOB	496,369	2,530	1,363,632	494,900	0	2,357,431	2357430.89

3300.20.10. INSTALL WELLS

3300.20.10. 5. EXTRACTION WELLS THERMAL
Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,

Includes Mobile NAPL extraction wells,

3300.20.10. 5. 5. "A" ZONE WELLS

USR AA Extraction Wells, Thermal		0.00	0.00	0.00	135.00	0.00	135.00	
	420.00 LFT	0	0	0	56,700	0	56,700	135.00
TOTAL "A" ZONE WELLS	1.00 JOB	0	0	0	56,700	0	56,700	56700.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.10. "B" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	7980.00	LFT	0	0	0	1,077,300	0	1,077,300	135.00
USR AA Additional Cost Wells in Slou gh Drilled w/Barge			0.00	0.00	0.00	5000.00	0.00	5000.00	
	10.00	EA	0	0	0	50,000	0	50,000	5000.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	1,127,300	0	1,127,300	1127300.00
3300.20.10. 5.15. "C" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	3028.00	LFT	0	0	0	408,780	0	408,780	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	408,780	0	408,780	408780.00
3300.20.10. 5.20. "D" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	4888.00	LFT	0	0	0	659,880	0	659,880	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	659,880	0	659,880	659880.00
3300.20.10. 5.25. "E" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	1375.00	LFT	0	0	0	185,625	0	185,625	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	185,625	0	185,625	185625.00
3300.20.10. 5.30. EXTRACTION PUMPS									
USR AA Extraction Pumps Incl Controllers			0.00	0.00	2500.00	0.00	0.00	2500.00	
	134.00	EA	0	0	335,000	0	0	335,000	2500.00
USR AA Extraction Pumps Incl Controllers; Top Loading for LNA			0.00	0.00	2700.00	0.00	0.00	2700.00	
	20.00	EA	0	0	54,000	0	0	54,000	2700.00
USR AA 600 SCFM Compressor to run pu mps			0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00	EA	0	0	40,000	0	0	40,000	40000.00
USR AA Discharge Tubing Pump to Wellhead; SS			0.00	0.00	11.00	0.00	0.00	11.00	
	16330	LFT	0	0	179,630	0	0	179,630	11.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Air Supply Tubing Wellhead to			0.00	0.00	6.00	0.00	0.00	6.00	
Pumps	16330	LFT	0	0	97,980	0	0	97,980	6.00
USR AA Pulse Counters w/ 4-20 ma Sig			0.00	0.00	395.00	0.00	0.00	395.00	
nal	154.00	EA	0	0	60,830	0	0	60,830	395.00
USR AA Liquid Level Measurment,			0.00	0.00	1000.00	0.00	0.00	1000.00	
Portable Magnahelic	1.00	EA	0	0	1,000	0	0	1,000	1000.00
USR AA Downwell Liquid Level Bubbler			0.00	0.00	2.00	0.00	0.00	2.00	
Tube	16000	LFT	0	0	32,000	0	0	32,000	2.00
USR AA Spare Parts; Initial Supply f			0.00	0.00	1000.00	0.00	0.00	1000.00	
or Pumps	1.00	LS	0	0	1,000	0	0	1,000	1000.00
USR AA Connection Fittings; Air &			0.00	0.00	200.00	0.00	0.00	200.00	
Discharg Tubing/Manifolds, Et c.	154.00	EA	0	0	30,800	0	0	30,800	200.00
USR AA 70 GPM Turbine Pump, High Hea			0.00	0.00	25000.00	0.00	0.00	25000.00	
d	5.00	EA	0	0	125,000	0	0	125,000	25000.00
TOTAL EXTRACTION PUMPS	160.00	EA	0	0	957,240	0	0	957,240	5982.75
3300.20.10. 5.35. INSTALL PUMPS, INSTRUMENTS									
USR AA Install Pumps			0.00	0.00	0.00	725.00	0.00	725.00	
	159.00	EA	0	0	0	115,275	0	115,275	725.00
USR AA Install Down-hole Instruments			0.00	0.00	0.00	450.00	0.00	450.00	
	318.00	EA	0	0	0	143,100	0	143,100	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	160.00	EA	0	0	0	258,375	0	258,375	1614.84
3300.20.10. 5.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	139.00	EA	0	0	0	34,750	0	34,750	250.00
TOTAL WELL TOP COMPLETION	138.00	EA	0	0	0	34,750	0	34,750	251.81

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	139.00	EA	0	0	0	139,000	0	139,000	1000.00
TOTAL WELL DEVELOPMENT	138.00	EA	0	0	0	139,000	0	139,000	1007.25
TOTAL EXTRACTION WELLS THERMAL	1.00	JOB	0	0	957,240	2,870,410	0	3,827,650	3827650.00
3300.20.10.10. STEAM INJECTION WELLS									
Injection well pricing includes development, handling of cuttings and liquid wastes,									
3300.20.10.10. 5. "A" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	3420.00	LFT	0	0	0	461,700	0	461,700	135.00
TOTAL "A" ZONE WELLS	1.00	JOB	0	0	0	461,700	0	461,700	461700.00
3300.20.10.10.10. "B" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	6935.00	LFT	0	0	0	936,225	0	936,225	135.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	936,225	0	936,225	936225.00
3300.20.10.10.15. "C" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	3469.00	LFT	0	0	0	468,315	0	468,315	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	468,315	0	468,315	468315.00
3300.20.10.10.20. "D" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	6417.00	LFT	0	0	0	866,295	0	866,295	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	866,295	0	866,295	866295.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.10.25. "E" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	2828.00	LFT	0	0	0	381,780	0	381,780	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	381,780	0	381,780	381780.00
3300.20.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	197.00	EA	0	0	0	320,125	0	320,125	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	320,125	0	320,125	320125.00
3300.20.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	197.00	EA	0	0	0	49,250	0	49,250	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	49,250	0	49,250	49250.00
3300.20.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	197.00	EA	0	0	0	197,000	0	197,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	197,000	0	197,000	197000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	3,680,690	0	3,680,690	3680690.00
3300.20.10.15. REINJECTION WELLS									
3300.20.10.15.25. "E" ZONE WELLS									
USR AA Reinjection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	840.00	LFT	0	0	0	113,400	0	113,400	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	113,400	0	113,400	113400.00
3300.20.10.15.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	3.00	EA	0	0	0	4,875	0	4,875	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	4,875	0	4,875	4875.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.15.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	3.00 EA	0	0	0	750	0	750	250.00
TOTAL WELL TOP COMPLETION	1.00 JOB	0	0	0	750	0	750	750.00
3300.20.10.15.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	3.00 EA	0	0	0	3,000	0	3,000	1000.00
TOTAL WELL DEVELOPMENT	1.00 JOB	0	0	0	3,000	0	3,000	3000.00
TOTAL REINJECTION WELLS	1.00 JOB	0	0	0	122,025	0	122,025	122025.00
3300.20.10.20. MONITORING WELLS								
3300.20.10.20. 5. INSTALL WELLS								
USR AA Install 4" Monitoring Wells,		0.00	0.00	0.00	100.00	0.00	100.00	
SS	5115.00 LFT	0	0	0	511,500	0	511,500	100.00
Casing and Screens								
TOTAL INSTALL WELLS	39.00 EA	0	0	0	511,500	0	511,500	13115.38
3300.20.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT								
M AIR AA Lo Flo Pump & Teflon Tubing		0.00	0.00	550.00	0.00	0.00	550.00	
	25.00 EA	0	0	13,750	0	0	13,750	550.00
USR AA Portable Air Compressor		0.00	0.00	1835.00	0.00	0.00	1835.00	
	1.00 EA	0	0	1,835	0	0	1,835	1835.00
USR AA Misc Tools & Sampling Equipme		0.00	0.00	1000.00	0.00	0.00	1000.00	
nt	1.00 EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and		0.00	0.00	0.00	100.00	0.00	100.00	
Discharge/Sampling System	25.00 EA	0	0	0	2,500	0	2,500	100.00
USR AA Sample Pump Tubing, Teflon Li		0.00	0.00	3.50	0.00	0.00	3.50	
ned	3600.00 LFT	0	0	12,600	0	0	12,600	3.50
USR AA Slip On Well Cap Assbly		0.00	0.00	65.00	0.00	0.00	65.00	
	25.00 EA	0	0	1,625	0	0	1,625	65.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Flexible Discharge Tubing			0.00	0.00	23.00	0.00	0.00	23.00	
Adaptor	25.00	EA	0	0	575	0	0	575	23.00
USR AA Digital Cycle Controller for			0.00	0.00	2240.00	0.00	0.00	2240.00	
Lo	1.00	EA	0	0	2,240	0	0	2,240	2240.00
Flow Bladder Pump									
USR AA Multi-parameter Flow Cell &			0.00	0.00	4495.00	0.00	0.00	4495.00	
Meter	1.00	EA	0	0	4,495	0	0	4,495	4495.00
USR AA Liquid Level Measurment/Drawd			0.00	0.00	815.00	0.00	0.00	815.00	
own	1.00	EA	0	0	815	0	0	815	815.00
Meter									
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	38,935	2,500	0	41,435	41435.00
3300.20.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole			0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	72.00	EA	0	0	0	117,000	0	117,000	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	117,000	0	117,000	117000.00
3300.20.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pi			0.00	0.00	0.00	250.00	0.00	250.00	
pe	36.00	EA	0	0	0	9,000	0	9,000	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	9,000	0	9,000	9000.00
3300.20.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	36.00	EA	0	0	0	36,000	0	36,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	36,000	0	36,000	36000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	38,935	676,000	0	714,935	714935.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.25. TREAT WELL DRILL LIQUIDS/CUTTING								
During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.								
The liquiids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.								
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	180.00 EA	0	0	0	72,000	0	72,000	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	40.00 MO	0	40,000	0	0	0	40,000	1000.00
USR AA Treat Contaminated Water		0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	750000 GAL	0	0	0	187,500	0	187,500	0.25
USR AA Onsite Steam Strip Drill		1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	3900.00 TON	7,020	122	0	0	214,500	221,642	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.75 MGL	0	0	0	66,783	0	66,783	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.75 MGL	0	0	0	10,849	0	10,849	14465.00
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.21 KLB	0	0	0	8,129	0	8,129	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.31 KLB	0	0	0	5,415	0	5,415	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	7,020	40,122	0	350,884	214,500	612,527	612526.56
3300.20.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW8310)	22.00	EA	0	0	0	3,542	0	3,542	161.00
M AIR AA PCP/Semivolatile Organics (8270)			0.00	0.00	0.00	180.00	0.00	180.00	
	22.00	EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00	JOB	0	0	0	9,416	0	9,416	9416.00

3300.20.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	66.00	EA	0	0	0	9,240	0	9,240	140.00
M AIR AA PCP/Semivolatile Organics (8270)			0.00	0.00	0.00	155.00	0.00	155.00	
	66.00	EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	66.00	EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600			0.00	0.00	0.00	55.00	0.00	55.00	
	66.00	EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290)			0.00	0.00	0.00	950.00	0.00	950.00	
	11.00	EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00	JOB	0	0	0	36,190	0	36,190	36190.00

3300.20.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geologist			59.40	0.00	0.00	0.00	0.00	59.40	
	1600.00	HR	95,040	0	0	0	0	95,040	59.40
USR AA Engineer/Scientist IV, Sampling Lead			59.40	0.00	0.00	0.00	0.00	59.40	
	160.00	HR	9,504	0	0	0	0	9,504	59.40

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	50.00	HR	3,355	0	0	0	0	3,355	67.10
USR AA Technician/Analyst IV, Sampli			33.00	0.00	0.00	0.00	0.00	33.00	
ng Tech	160.00	HR	5,280	0	0	0	0	5,280	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	20.00	HR	1,452	0	0	0	0	1,452	72.60
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
office.	800.00	MI	0	0	0	0	248	248	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging			0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	12.00	DAY	0	0	0	0	2,376	2,376	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	12.00	DAY	0	0	0	0	504	504	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	6.00	EA	0	0	0	0	72	72	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	600.00	LFT	0	0	1,500	0	0	1,500	2.50
USR AA Misc Sampling			0.00	0.00	400.00	0.00	0.00	400.00	
Equipment/Materials	1.00	LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00	JOB	115,326	0	1,900	50	3,700	120,976	120976.20
TOTAL INSTALL WELLS	1.00	JOB	122,346	40,122	998,075	7,745,665	218,200	9,124,409	9124408.76

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15. PIPING								
3300.20.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	3400.00 LF	25,915	606	20,597	0	0	47,119	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40		9.62	0.52	8.92	0.00	0.00	19.06	
A53	3400.00 LF	42,002	2,261	38,924	0	0	83,187	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40		5.94	0.14	7.18	0.00	0.00	13.26	
A53	1200.00 LF	9,147	214	11,067	0	0	20,427	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std		360.80	19.42	125.85	0.00	0.00	506.07	
Wt	34.00 EA	15,751	848	5,494	0	0	22,093	649.78
MIL PL 6" 90 Degree LR Weld Ell, Std		274.51	6.42	67.81	0.00	0.00	348.74	
Wt	24.00 EA	8,459	198	2,089	0	0	10,747	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	1380.00 LF	14,025	328	5,793	0	0	20,146	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	414.00 EA	88,416	2,068	14,658	0	0	105,142	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	138.00 EA	5,610	131	478	0	0	6,219	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	690.00 EA	52,593	1,230	22,769	0	0	76,592	111.00
AIR AA Slip On Flange 6"		158.30	3.70	40.70	0.00	0.00	202.71	
	45.00 EA	7,124	167	1,832	0	0	9,122	202.71
MIL PL 8" Weld Neck Flange, 150#		156.02	8.40	100.07	0.00	0.00	264.49	
	45.00 EA	9,015	485	5,782	0	0	15,282	339.59
MIL PL 4" x 3" Reducer, Eccentric		166.64	3.90	26.44	0.00	0.00	196.98	
	276.00 EA	59,052	1,381	9,371	0	0	69,804	252.91
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	5.00 EA	535	13	74	0	0	621	124.24

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	828.00	EA	106,293	1,012	8,008	0	0	115,313	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	11.91	0.00	0.00	131.77	
ets	45.00	EA	6,860	65	688	0	0	7,613	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	13.30	0.00	0.00	133.16	
ets	45.00	EA	6,860	65	769	0	0	7,694	170.97
USR PL Pipe Supports			59.36	1.39	200.00	0.00	0.00	260.75	
	600.00	EA	45,733	1,070	154,077	0	0	200,880	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate			256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	4.00	EA	1,317	13	3,123	0	0	4,454	1113.50
125 #									
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate			224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	4.00	EA	1,153	12	1,878	0	0	3,042	760.56
125 #									
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate			114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	276.00	EA	40,637	373	78,902	0	0	119,912	434.46
125 #									
USR PL Fit/Cut/Weld 4" pipe to 6" or			237.46	5.55	0.00	0.00	0.00	243.01	
8"	138.00	EA	42,074	984	0	0	0	43,058	312.02
(No Tees required)									
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe			3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	3400.00	LF	17,050	117	10,914	0	0	28,080	8.26
s									
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv			3.91	0.03	1.00	0.00	0.00	4.93	
r	1200.00	LF	6,017	41	1,541	0	0	7,599	6.33
w/Fire Retardant Jackets									
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co			7.81	0.05	1.00	0.00	0.00	8.86	
ver	3400.00	LF	34,099	233	4,366	0	0	38,698	11.38
w/Fire Retardant Jackets									
L MIL PL 0.006" Alum Insul Jacket w/Ba			6.25	0.04	0.16	0.00	0.00	6.45	
nds	10650	SF	85,448	584	2,152	0	0	88,184	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00	JOB	731,185	14,498	405,345	0	0	1,151,028	1151027.63

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.10. LIQUID RECOVERY SYSTEM									
AIR PL Pipe, Iron, Threaded, Sch 80			7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	3400.00	LF	33,373	306	27,066	0	0	60,746	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	6000.00	LF	60,978	1,426	25,186	0	0	87,590	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std			96.23	2.25	16.68	0.00	0.00	115.16	
Wt	30.00	EA	3,707	87	642	0	0	4,436	147.86
MIL PL 3"Tee,Full Size Butt Weld Std			143.91	3.37	36.78	0.00	0.00	184.06	
Wt	30.00	EA	5,543	130	1,417	0	0	7,090	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	414.00	EA	16,830	394	1,435	0	0	18,658	45.07
AIR PL Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	828.00	EA	84,149	1,968	21,475	0	0	107,592	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	552.00	EA	33,659	320	2,760	0	0	36,740	66.56
M MIL PL 3" Bronze 125# Gate Valve			70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	12.00	EA	1,087	10	1,471	0	0	2,569	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc			23.09	0.19	25.86	0.00	0.00	49.14	
rd	138.00	EA	4,091	34	4,581	0	0	8,706	63.09
Lubricated,Wrench Oper w/Wrench									
M MIL PL 2" Single Disc Type Check Val			37.62	0.33	72.27	0.00	0.00	110.23	
ve	138.00	EA	6,666	59	12,805	0	0	19,531	141.53
IB Wafer Type- 125#									
M MIL PL 2" Bronze 125# Gate Valve			46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	276.00	EA	16,362	138	11,227	0	0	27,726	100.46
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00	EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover			4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	3400.00	LF	19,626	134	4,341	0	0	24,100	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov			4.75	0.03	1.23	0.00	0.00	6.02	
er	6000.00	LF	36,609	250	9,509	0	0	46,368	7.73
w/Fire Retardant Jackets									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL 0.006" Alum Insul Jacket w/Ba		7.81	0.05	0.16	0.00	0.00	8.02	
nds	2640.00 SF	26,477	181	534	0	0	27,191	10.30
USR AA Flexible Hose; SS; 5' long; 2		14.84	0.35	150.00	0.00	0.00	165.19	
"	158.00 EA	2,345	55	23,700	0	0	26,100	165.19
dia.								
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	355,448	5,527	148,150	0	0	509,125	509125.50

3300.20.15.11. EXTRACTION WELLHEAD SPOOL/FTG
Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho		474.91	11.11	350.00	0.00	0.00	836.02	
p	138.00 EA	65,538	1,533	48,300	0	0	115,370	836.02
Fabricated)								
USR AA Connection Fittings; Air &		118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La	158.00 EA	18,759	439	0	0	0	19,198	121.50
bor								
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00 JOB	84,297	1,972	48,300	0	0	134,568	134568.10

3300.20.15.15. STEAM INJECTION SYSTEM

3300.20.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40		8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	6000.00 LF	69,166	698	52,090	0	0	121,953	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac		52.37	0.53	50.23	0.00	0.00	103.13	
k	60.00 EA	4,035	41	3,870	0	0	7,945	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	198.00 EA	8,049	188	686	0	0	8,924	45.07
MIL PL 4" Tee, Red Out Butt Weld Std		249.95	5.85	51.39	0.00	0.00	307.19	
Wt	198.00 EA	63,545	1,486	13,066	0	0	78,097	394.43
AIR AA Slip On Flange 4"		105.54	2.47	25.70	0.00	0.00	133.70	
	205.00 EA	21,635	506	5,269	0	0	27,409	133.70

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	205.00	EA	26,317	251	1,983	0	0	28,550	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En			306.39	2.92	244.12	0.00	0.00	553.44	
ds	25.00	EA	9,835	94	7,836	0	0	17,765	710.60
Bellows w/Int Sleeves&Ext Covers									
MIL PL Pipe Support			76.64	1.58	27.24	0.00	0.00	105.46	
	600.00	EA	59,044	1,215	20,982	0	0	81,241	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	25.00	EA	1,087	9	1,404	0	0	2,500	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov			5.10	0.03	1.59	0.00	0.00	6.73	
er	6000.00	LF	39,298	269	12,282	0	0	51,849	8.64
w/Fire Retardant Jackets									
MIL PL 0.006" Alum Insul Jacket w/Ba			8.93	0.06	0.16	0.00	0.00	9.15	
nds	3000.00	SF	34,386	235	606	0	0	35,227	11.74
TOTAL MAIN HEADER PIPING	1.00	JOB	336,396	4,991	120,074	0	0	461,460	461460.28
3300.20.15.15.10. LATERAL PIPING									
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	3960.00	LF	40,245	941	16,623	0	0	57,809	14.60
AIR AA Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	1584.00	EA	125,376	2,932	31,997	0	0	160,305	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	1980.00	EA	120,735	1,150	9,901	0	0	131,785	66.56
MIL PL 3" Tee, Red Out Butt Weld Std			143.91	3.37	36.94	0.00	0.00	184.22	
Wt	25.00	EA	4,619	108	1,186	0	0	5,913	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En			263.84	2.51	209.44	0.00	0.00	475.79	
ds	198.00	EA	67,075	639	53,245	0	0	120,959	610.90
Bellows w/Int Sleeves&Ext Covers									
MIL PL 3" OD Snap-On Plastic Valve T			19.53	0.16	6.00	0.00	0.00	25.70	
ag	792.00	EA	19,864	167	6,099	0	0	26,130	32.99
Includes Insulation									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL NDT, X-Ray Welds of 3" Dia Pi		50.79	0.45	30.00	0.00	0.00	81.24	
pe	150.00 EA	9,782	87	5,778	0	0	15,647	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	20.00 EA	39,474	351	0	0	0	39,825	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	3960.00 LF	24,162	165	6,276	0	0	30,603	7.73
w/Fire Retardant Jackets								
M MIL PL 3" Pipe Support		57.13	1.18	20.00	0.00	0.00	78.31	
	396.00 EA	29,050	598	10,169	0	0	39,816	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di		61.16	0.56	56.88	0.00	0.00	118.60	
sc	396.00 EA	31,096	285	28,921	0	0	60,303	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer								
M MIL PL 3" Flg St Press Regul&Reducer		128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	198.00 EA	32,631	763	499,264	0	0	532,658	2690.19
Sgl Seat,Sprg Load Dir Act Diap								
M MIL PL 3" Twin Disc Type Check Valve		45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	198.00 EA	11,444	109	16,232	0	0	27,785	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T		25.39	0.21	18.68	0.00	0.00	44.29	
hrd	198.00 EA	6,456	54	4,749	0	0	11,260	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	4.00 EA	7,895	70	0	0	0	7,965	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	1200.00 EA	48,782	1,141	4,160	0	0	54,082	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th		33.86	0.28	43.73	0.00	0.00	77.87	
rd	396.00 EA	17,216	145	22,234	0	0	39,594	99.99
TOTAL LATERAL PIPING	1.00 JOB	635,902	9,706	716,833	0	0	1,362,441	1362441.18

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	198.00	EA	47,016	1,100	99,000	0	0	147,116	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	47,016	1,100	99,000	0	0	147,116	147115.72
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	1,019,314	15,796	935,907	0	0	1,971,017	1971017.18
3300.20.15.20. H2O REINJECTION SYSTEM									
MIL PL 4" (10cm) Galv Steel Pipe			8.98	0.09	9.10	0.00	0.00	18.16	
ASTM A-53, T&C, Sch 40	1500.00	LF	17,291	174	17,517	0	0	34,983	23.32
MIL PL 2-1/2" (60mm) Galv Steel Pipe			5.73	0.05	4.64	0.00	0.00	10.43	
ASTM A-53, T&C, Sch 40	500.00	LF	3,681	34	2,980	0	0	6,695	13.39
MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	60.52	0.00	0.00	113.42	
v	10.00	EA	672	7	777	0	0	1,456	145.62
MIL PL 2-1/2"90 Degree Ell,150# MI G			36.70	0.34	20.80	0.00	0.00	57.84	
alv	10.00	EA	471	4	267	0	0	743	74.26
MIL PL 4" 45 Degree Ell, 150# MI Gal			52.37	0.53	69.20	0.00	0.00	122.10	
v	10.00	EA	672	7	889	0	0	1,568	156.78
MIL PL 2-1/2"45 Degree Ell,150# MI G			36.70	0.34	28.39	0.00	0.00	65.43	
alv	10.00	EA	471	4	365	0	0	840	84.00
MIL PL 4" Tee, Red Out 150# MI Galv			66.15	0.67	98.70	0.00	0.00	165.52	
	2.00	EA	170	2	253	0	0	425	212.52
MIL PL 4" Cap, 150# MI Galvanized			17.96	0.18	32.49	0.00	0.00	50.63	
	1.00	EA	23	0	42	0	0	65	65.00
MIL PL 2-1/2" Union, 150# MI Galvani			39.89	0.37	39.11	0.00	0.00	79.36	
zed	4.00	EA	205	2	201	0	0	408	101.90
MIL PL 2-1/2"Nipple,Galv Stl Sch 40,			12.23	0.11	8.79	0.00	0.00	21.13	
4"	10.00	EA	157	1	113	0	0	271	27.13
4"(10cm) Long									
MIL PL 4"Nipple,Galv Stl Sch 40, 4"			17.96	0.18	12.92	0.00	0.00	31.05	
4"(10cm) Long	10.00	EA	231	2	166	0	0	399	39.87

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4" Screwed Flange,Galv (125#			71.83	0.72	17.49	0.00	0.00	90.04	
CI)	4.00	EA	369	4	90	0	0	462	115.62
MIL PL 2-1/2"Scrd Flange,Galv (125#			42.28	0.39	10.00	0.00	0.00	52.66	
CI)	4.00	EA	217	2	51	0	0	270	67.61
MIL PL 4"Coupling,Straight 150# MI G			52.37	0.53	50.70	0.00	0.00	103.60	
alv	10.00	EA	672	7	651	0	0	1,330	133.02
MIL PL 2-1/2"Coupling,Strt 150# MI G			36.70	0.34	19.04	0.00	0.00	56.07	
alv	10.00	EA	471	4	244	0	0	720	72.00
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	6.00	EA	244	6	21	0	0	270	45.07
AIR AA 4" Weldolet			158.30	3.70	7.20	0.00	0.00	169.21	
	20.00	EA	3,166	74	144	0	0	3,384	169.21
M MIL PL Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	150.00	EA	11,004	226	3,852	0	0	15,082	100.55
AIR AA 2 1/2" Weldolet			105.54	2.47	4.90	0.00	0.00	112.90	
	20.00	EA	2,111	49	98	0	0	2,258	112.90
TOTAL H2O REINJECTION SYSTEM	1.00	JOB	42,299	610	28,720	0	0	71,630	71629.65
3300.20.15.25. STEAM GENERATION SYSTEM									
USR AA Mechanical Subcontractor F&I			0.00	0.00	0.00	25000.00	0.00	25000.00	
Steam Generation System Pipin	1.00	JOB	0	0	0	25,000	0	25,000	25000.00
g									
TOTAL STEAM GENERATION SYSTEM	1.00	JOB	0	0	0	25,000	0	25,000	25000.00
3300.20.15.30. WATER TREATMENT SYSTEM									
USR AA Mechanical Piping & Hookup			0.00	0.00	0.00	220000.00	0.00	220000.00	
Treatment System	1.00	JOB	0	0	0	220,000	0	220,000	220000.00
TOTAL WATER TREATMENT SYSTEM	1.00	JOB	0	0	0	220,000	0	220,000	220000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.35. AIR PIPING									
MIL PL 2"(50mm) A-53 Pipe, Sch 40			4.83	0.04	2.13	0.00	0.00	7.00	
Not Incl Hangers or Fittings	5500.00	LF	34,097	313	15,042	0	0	49,451	8.99
MIL PL 1"(25mm) A-53 Pipe, Sch 40			3.21	0.03	1.02	0.00	0.00	4.25	
Not Incl Hangers or Fittings	3300.00	LF	13,591	125	4,303	0	0	18,018	5.46
MIL PL 2" 90 Degree ELL,150# MI Blac			24.79	0.23	6.25	0.00	0.00	31.27	
k	60.00	EA	1,910	18	481	0	0	2,409	40.15
MIL PL 1" 90 Degree Ell, 150# MI Bla			15.29	0.14	1.96	0.00	0.00	17.39	
ck	340.00	EA	6,675	61	856	0	0	7,592	22.33
MIL PL 1" Coupling, Strt 150# MI Bla			15.29	0.14	2.29	0.00	0.00	17.72	
ck	120.00	EA	2,356	22	353	0	0	2,731	22.75
MIL PL 2" Coupling, Strt 150# MI Bla			24.79	0.23	5.68	0.00	0.00	30.70	
ck	60.00	EA	1,910	18	438	0	0	2,365	39.42
MIL PL 1" Union, 150# MI Black			20.85	0.19	5.68	0.00	0.00	26.72	
	720.00	EA	19,275	177	5,252	0	0	24,703	34.31
MIL PL 2" Union, 150# MI Black			36.70	0.34	12.09	0.00	0.00	49.12	
	60.00	EA	2,827	26	932	0	0	3,784	63.07
MIL PL 1" Nipple, Black Stl Sch 40,			7.06	0.06	0.59	0.00	0.00	7.72	
4"	340.00	EA	3,081	28	259	0	0	3,368	9.91
MIL PL 2" Nipple, Black Stl Sch 40,			9.86	0.09	1.19	0.00	0.00	11.14	
4"	60.00	EA	760	7	92	0	0	858	14.31
MIL PL 2" Tee, Red Out 150# MI Galv			36.70	0.34	13.41	0.00	0.00	50.45	
	340.00	EA	16,019	147	5,856	0	0	22,022	64.77
MIL PL 1" Tee, Straight 150# MI Galv			20.85	0.19	3.66	0.00	0.00	24.70	
	340.00	EA	9,102	84	1,598	0	0	10,784	31.72
MIL PL 1"D Plug Valve, Semi-Stl,Scrd			28.22	0.24	29.42	0.00	0.00	57.88	
Lubricated,Wrench Oper w/Wren	340.00	EA	12,318	104	12,845	0	0	25,266	74.31
ch									
MIL PL 2"D Plug Valve, Semi-Stl,Scrd			50.79	0.43	31.31	0.00	0.00	82.53	
Lubricated,Wrench Oper w/Wren	30.00	EA	1,956	16	1,206	0	0	3,179	105.97
ch									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 1"Thrd St Press Regul & Red,I			59.06	0.53	356.42	0.00	0.00	416.00	
B	340.00	EA	25,781	230	155,596	0	0	181,606	534.14
Sgl Seat,Sprg Load Dir Act Diap									
MIL PL 1" ID Hose x 1-1/4" MPT			13.74	0.07	0.82	0.00	0.00	14.63	
Serrated Shank Nipple	340.00	EA	5,997	32	359	0	0	6,388	18.79
TOTAL AIR PIPING	1.00	JOB	157,654	1,405	205,467	0	0	364,526	364526.14
TOTAL PIPING	1.00	JOB	2,390,197	39,808	1,771,889	245,000	0	4,446,894	4446894.19
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	3,222,019	85,237	7,970,535	9,625,100	224,180	21,127,071	21127070.99

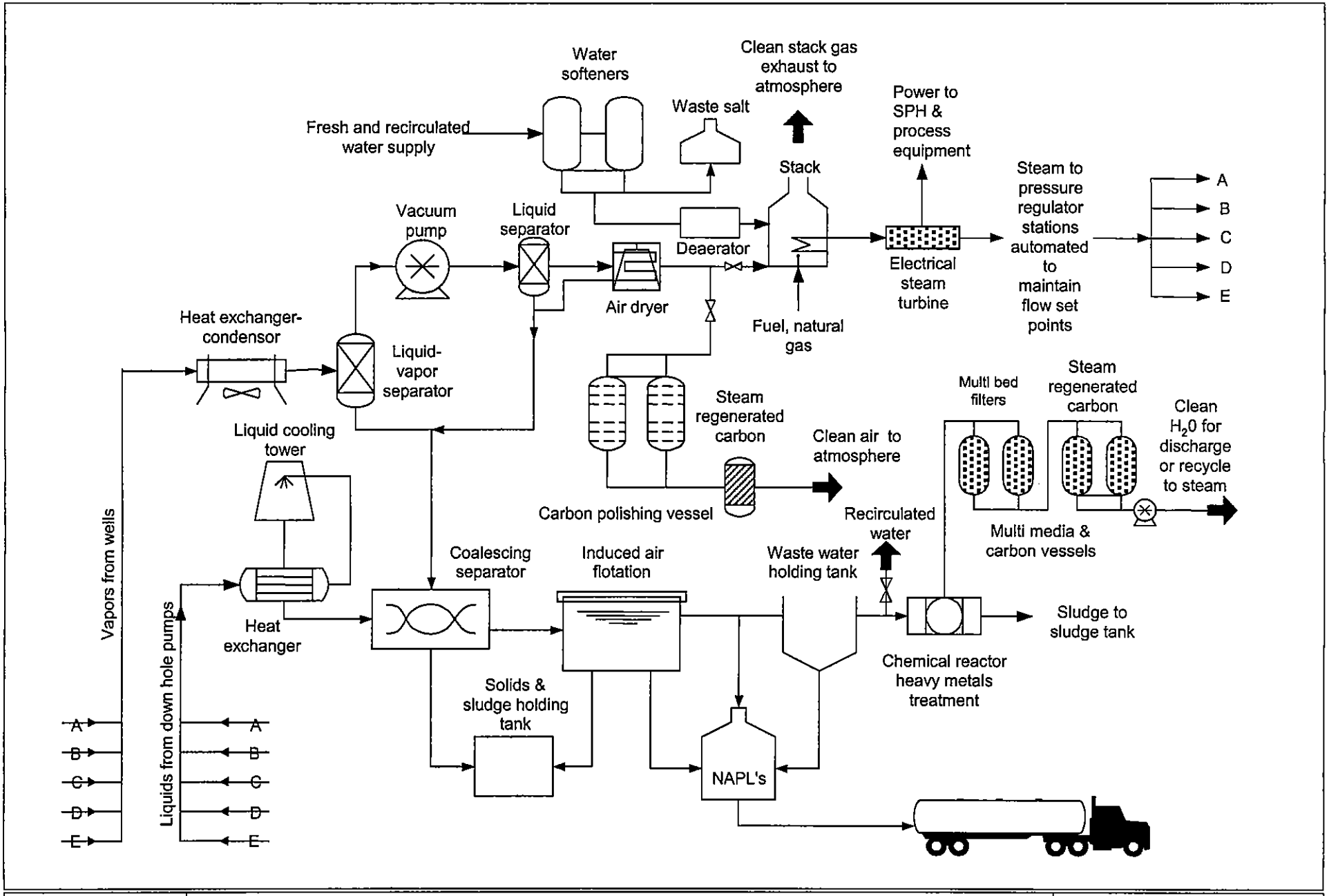


Figure 4-1
Surface Process Diagram

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN
McCormick and Baxter Superfund Site
Stockton, California

Table 3-10
Total Liquid Extraction Rates and Design Capacity of Effluent Treatment System

	Scenario 1	Scenario 2	Scenario 3
Equivalent steam injection rate	186 gpm	274 gpm	386 gpm
Design extraction rate	280 gpm	410 gpm	580 gpm
Miscellaneous process water	40 gpm	55 gpm	70 gpm
Over-extraction need from pump & treat estimate	235 gpm	235 gpm	235 gpm
Total effluent treatment system capacity	475 gpm	575 gpm	700 gpm

Table 4-2
Effluent Treatment System—Components and Sizes

Component	Parameter	Unit	Scenario 1	Scenario 2	Scenario 3	Comment/assumption
Vapor phase liquid separator 1	Air flow rate	scfm air	4,733	7,100	9,467	Non-condensable gas plus 10% of injected steam as condensable vapor
	Liquid flow rate	gpm condensate	22	27	32	Assuming max 5% of liquid extracted with vapor stream
Liquid phase heat exchanger	Liquid flow rate	gpm water	435	535	635	Injected plus 235 gpm
	Cooling capacity	MM BTU/hr	22	27	32	Assumed 100 F cooling
Vapor phase heat exchanger/condensor	Cooling capacity	MM BTU/hr	12	17	22	Assumed 10% of injected energy as steam and energy in 200F condensate
Vapor phase liquid separator 2	Air flow rate	scfm air	1,000	1,500	2,000	
	Liquid flow rate	gpm condensate	23	34	45	Based on maximum vapor phase cooling capacity
Vacuum pumps	Air flow rate	scfm	1,000	1,500	2,000	
	Vacuum	psig	-10	-10	-10	Need to apply vacuum
Vapor treatment units	Air flow rate	scfm	1,000	1,500	2,000	
Water surge tank	Retention time	hours	1	1	1	Need settling and separation time for solids and NAPL
	Minimum capacity	gallons	26,100	32,100	38,100	
Dissolved Air Floatation	Water flow rate	gpm	435	535	635	Recovered fluid and condensate not to exceed maximum pumping rate
	NAPL flow rate	gpm	11	13	16	Assumed max NAPL ratio of 2.5% of total water flow
Multimedia filters	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
Water treatment unit (GAC)	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
NAPL holding tanks	Capacity	gallons	21,000	21,000	21,000	Tanks added and emptied for disposal as needed
	Minimum number	#	2	2	2	Empty backup tank on-site

Table 4-1
Maximum Injection Pressures for Different Depth Zones

	A	B	C	D	E
Depth to top of injection screen (ft)	25	60	125	155	240
Injection pressure (psig)	12.5	30	63	78	107

Table 3-1
Summary of Well Counts by Layer and Scenario

Scenario 1	SES Injection Wells	SES Extraction Wells	SES Dual Purpose Wells	Collocated Injection and Electrical Heating Wells	Collocated Extraction and Electrical Heating Wells	New Perimeter Monitoring Wells	New NAPL Extraction Wells	Deep VEA Hole	Shallow VEA Hole
Completion Zone									
A	53	2	0	0	0	8	5	0	0
B	54	69	0	0	0	10	4	0	13
C	13	14	0	0	0	10	0	0	0
D	3	11	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	25	0
Scenario 2	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VEA Hole**	**Shallow VEA Hole**
Zone of Completion									
A	57	2	0	0	0	8	5	0	0
B	73	74	0	0	9	10	1	0	13
C	22	20	0	0	0	7	0	0	0
D	3	14	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	27	0
Scenario 3	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VEA Hole**	**Shallow VEA Hole**
Zone of Completion									
A	69	2	0	0	0	8	0	0	0
B	85	97	0	0	9	10	0	0	13
C	28	22	0	0	0	8	0	0	0
D	23	16	0	32	13	5	0	0	0
E	12	6	2	0	0	6	0	27	0

"Steve Carroll" <carroll@steamtech.com>

07/02/01 09:22 AM

To: Harry_Ehlers@URSCorp.com
cc:
Subject: RE: angled drilling at McCormick and Baxter site

Good Morning Harry,

further to our telephone conversation of Friday afternoon, I have made some enquiries and found that San Francisco - Sacramento area environmental drilling contractors typically had doubts about drilling to depths of 300 feet at the angles of interest. On the face of it, this might require some changes to the design, possibly with additional, deeper, drilling from a barge in the slough.

I am assured by Patrick Langan (775-246-0296) of Boart Longyear in Dayton, NV, that they would anticipate no difficulty in drilling to these depths at angles as low as 45 degrees using rotary or sonic rigs with down-hole casing advance and that 4 or 6-inch casing and screen could be installed. You may wish to talk to him.

Let me know if I can be of any assistance.

Steve Carroll

June 12, 2001

(661) 322 6552 Fax
(908) 653-1313 Fax

John E. Spear
URS Corporation
12 Commerce Drive
Cranford, NJ 07016-1101

Tim Cechini
Lane Christiansen
Fontana, CA

Re: McCormick and Baxter Superfund Site
Stockton, CA
Drilling Pricing

Dear Tim:

As we discussed in early May we need budget pricing for the drilling and installation of wells at the referenced site. We are working on an Engineers estimate for the Feasibility of this option under contract with the USACOE.

The pricing could be broken down in the following unit prices:

		Unit Price
1. Drilling wells, 12" dia. (288 Wells)	36,851 LFT	135 00/FT
These are extraction and injection wells with 6" casing/screens all Stainless Steel. Note that 15 of these wells will be drilled off barge in the Old Mormon Slough. Also 15 of these wells will be drilled at an angle from the bank under the Slough.		
2. Install URS furnished Electrodes	44 EA	450 00/each
These electrodes will go in the bottom of some of the 288 wells drilled above.		
3. Install URS furnished Extraction Pumps	124 EA	725 00/each
4. Install URS furnished Thermocouples ave 40 00/lft →	38 EA	9000 00/each
These thermocouples (VEA's) will be installed in 4" dia holes and grouted solid. Total drilling for these 38 will be 8,560 vertical feet.		
5. 12" Protective Case and Well head up to flange	288 EA	250/well
6. Install URS furnished Down Hole Instruments	288 EA	450 00/each
7. Well Development	288 EA	1000 00/each
288 Extraction and Injection wells. Monitoring wells below.		
8. Pump tests	4 EA	6,300 00/well

Extraction Well
pumps 725 00
Level 450
Temp 450
1625

9. Monitoring wells (39 each with 4" SS Piping/Screens) 5,580 LFT 100/ft
Complete including drilling, developing, piping, locking caps,

All wells above would include packing, grout etc required in ea. Well.

If you have any questions please call me in my NJ office at 908-653-3154 or 908-653-1300. My fax number in NJ is 908-653-1313.

Cordially,

John E. Spear

[redacted]

BPeake@qedenv.com

06/21/2001 10:49 AM
AST

To:john_spear@urscorp.com
cc:MParker@qedenv.com, telecorder@aol.com
bcc:
Subject:Budget Pricing

Jack

You are working on a very interesting project. Hopefully your proposal proves to be

QED provided a large dedicated groundwater sampling system at the McCormick Baxter s

Please let us know how things progress and if you need any additional information.

Thank you

Brad Peake
Regional Sales Manager
Severn Trent/ QED Environmental Systems
800-624-2026
bpeake@qedenv.com

(See attached file: McCormickBaxterSteam.xls)

McCormickBaxterSteam.xls	**Type:** application/msexcel **Name:** McCormickBaxterSteam.xls

Item	Description	Quantity	Unit Price	Extended Price	
1	HammerHead Pump, bottom load, high temp, Stainless	163	2500	$ 407,500.00	
2	HammerHead Pump, top load, high temp, Stainless	20	2700	$ 54,000.00	
3	Air Compressor, Rotary Screw, NEMA 4, 600 scfm, 125 HP	1	40000	$ 40,000.00	
4	Flexible discharge tubing, pump to piping manifold	14000	11	$ 154,000.00	
5	Air supply tubing, pump to wellhead, stainless steel	14000	6	$ 84,000.00	
6	Pulse Counter with output 4-20 ma signal	163	395	$ 64,385.00	
7	Liquid level measurement, portable magnahelic	1	1000	$ 1,000.00	
7a	Downwell liquid level bubbler tube	14000	2	$ 28,000.00	
8	Spare parts for 163 HammerHead pumps (7 years)	7	6000	$ 42,000.00	
				$ 874,885.00	
	Prices are budgetary and not intended to be final. Pricing				
	does not include freight or any applicable sales or use tax.				

HammerHead™

H4 Series (wells 4" & up)

INSTALLATION & OPERATION MANUAL

Models H45SSB, H45SEB, HF45SSB, HF45SEB, H45SET, HF45SET, and HF43SET

HAMMERHEAD™
CLEANUP PUMPS

QED GroundWater Specialists®
P.O. Box 3726 Ann Arbor, MI 48106 USA

Part No. 95067
REV.#2 1-2-95

HAMMERHEAD™ CLEANUP PUMPS

HammerHead™ H4 Series pumps (patent pending) are high-rate, air-driven pneumatic pumps primarily useful for total fluids applications. They run automatically, with the Hammer Drive magnetic relay and internal float system. The system senses liquid level in the pump, turning the air supply on when the pump is full, and turning it off as soon as the pump empties.

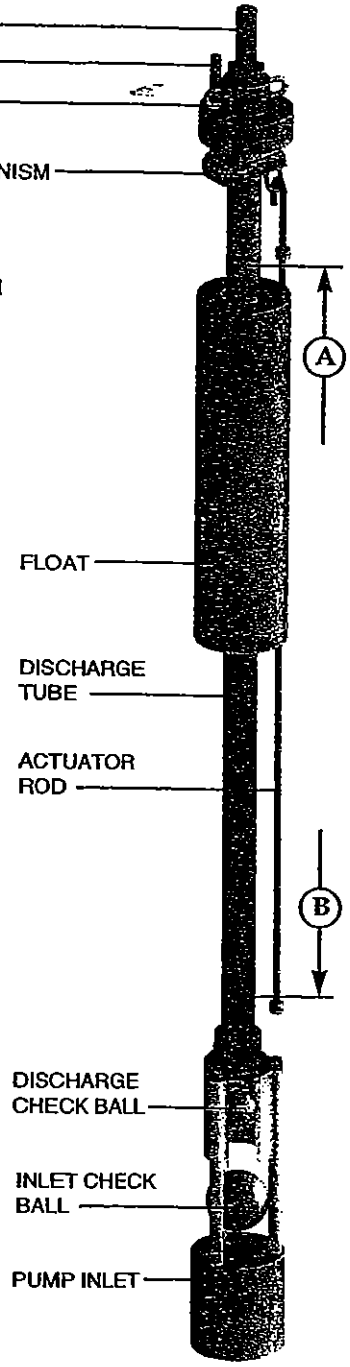
With built-in control, a HammerHead pump doesn't require air cycle timers or on-off level controls at the wellhead, simplifying system design. System setup is easy—just run air to each well. Continued operation is truly hands-off. The pump constantly reacts to changes in well yield, so it always pumps at the highest rate possible, and shuts down automatically when the well drops below pumping level. (NOTE: H4 Series pumps require a minimum of 3.5 feet of liquid above the bottom of the inlet in order to run.)

Because cycling is controlled downwell, a HammerHead pump is either refilling or discharging 100% of the time. There's no waiting between active phases of the cycle for the entire length of air supply tubing to re-pressurize. This operating efficiency enables H4 Series pumps to deliver maximum flow rates of more than 11 gallons per minute while also saving on air supply requirements. It also keeps air out of the liquid discharge system, preventing over-pumping, foaming, and emulsification.

The HammerHead pumping mechanism uses the same high-clearance design and stay-clean ball check valves that set the PULSE PUMP® standard for field performance without clogging or breakdowns. All parts, including the Hammer Drive system, are easily field serviceable.

HOW THE HAMMERHEAD PUMP WORKS

- An H4 Series pump requires a minimum depth of 42" of liquid (measured from the bottom of the pump) to begin pumping.
- The pump automatically shuts off when the liquid level is pumped down below this level, and will automatically begin pumping again once well level has recovered.



A. Top of float with pump full
Float in this position slides the actuator rod upward, triggering Hammer Drive mechanism and causing air to enter the pump. The air pressure seats the inlet check ball, keeping liquid from entering or leaving through the inlet. Liquid in the pump body is forced into the discharge tube and up to the surface. The discharge check ball is unseated by the upward force of the liquid.

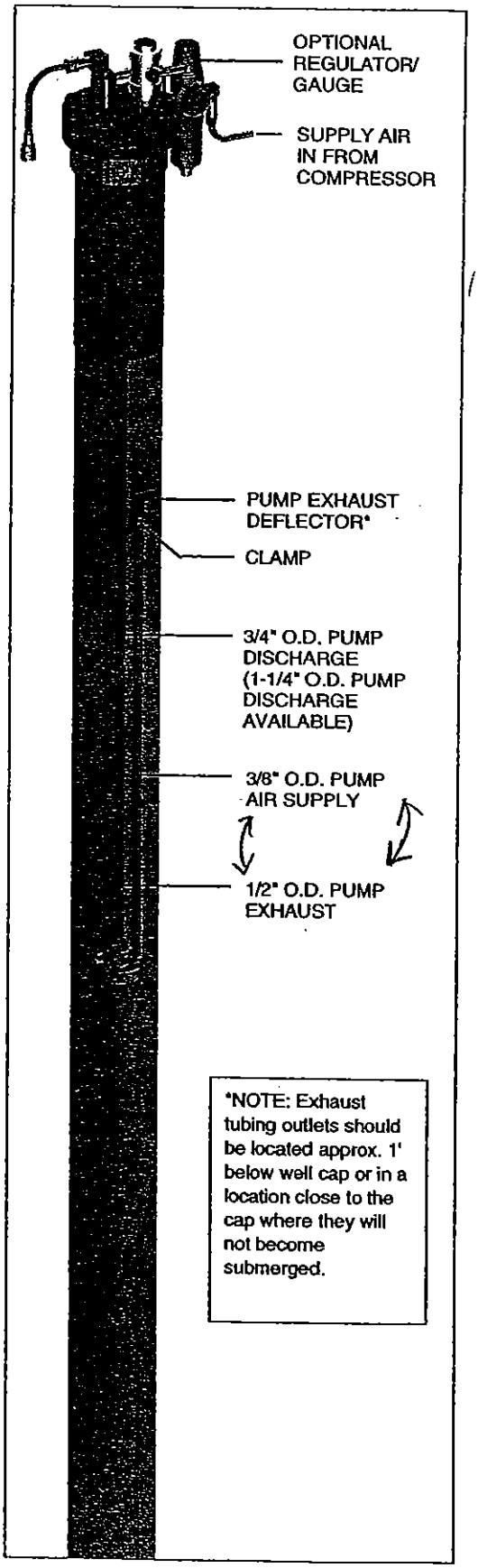
B. Bottom of float with pump empty
Float in this position slides actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (no longer having any pressure holding it down), which allows the next fill of liquid from the well into the pump. As the pump refills, the float rises back to the top position and the cycle is repeated. The discharge check ball is seated by the weight of liquid in the discharge tube above it, preventing that liquid from falling back into the pump body.

H4 SERIES SPECIFICATIONS

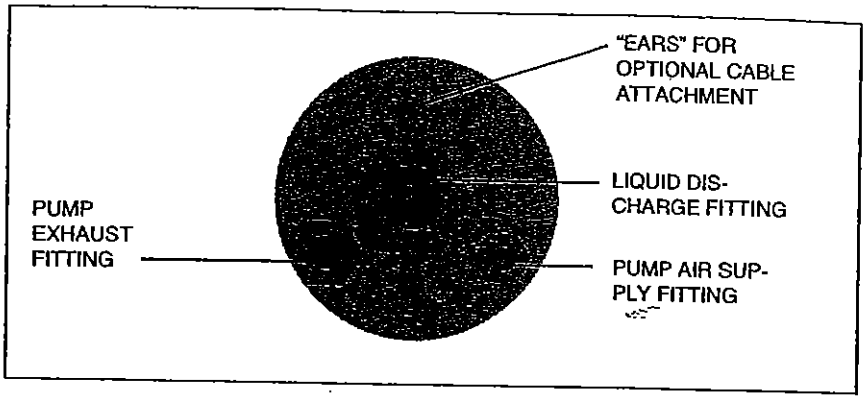
	H4 Series Bottom Inlet	H4 Series Top Inlet	Short H4, Top Inlet
Model No.	H45SSB, H45SEB, HF45SSB, HF45SEB	H45SET, HF45SET	HF43SET
Pump Type	Positive Air Displacement	Positive Air Displacement	Positive Air Displacement
Inlet	Bottom	Top	Top
O.D.	3.5" (89 mm)	3.5" (89 mm)	3.5" (89 mm)
Length	55" (140 cm)	60" (152 cm)	42" (105 cm)
Weight	23.5 lbs. (10.7 kg)	24.0 lbs. (10.9 kg)	16.0 lbs. (7.3 kg)
Materials	Stainless steel construction, with Teflon® inlet and discharge check balls, stainless steel or epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings.
Fittings: Type*	Barb	Barb	Barb
Sizes: Liquid Discharge	3/4" (19 mm) O.D. (H45SSB, H45SEB) or 1-1/4" (32 mm) O.D. (HF45SSB, HF45SEB)	3/4" (19 mm) O.D. (H45SET) or 1-1/4" (32 mm) O.D. (HF45SET)	1 1/4" (32 mm) O.D. Tube
Air Supply	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing
Exhaust	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing
Pump Stroke	0.8 gal. (2850 ml.)	0.8 gal. (2850 ml.)	0.32 gal. (1200 ml.)
Operating pressure range	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)	10-100 psi (70- 695 kPa)
Maximum lift	300 ft. (90 m)	300 ft. (90 m)	200 ft. (60 m)
Maximum flow rate	14+ GPM (54+ LPM) HF45SSB, HF45SEB	11+ GPM (41+ LPM) HF45SET	10 GPM (38 LPM)
Minimum submergence	42" (107 cm) above pump bottom	Top Inlet Port— 58" (147 cm) above bottom of pump	Top Inlet Port— 38" (97 cm) above bottom of pump
Density of pumped liquid	1.0 g/cc (stainless float); 0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)
Cap sizes**	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)

* Note: Pumps are available with tubing or hose; quick disconnect fittings are available on request.

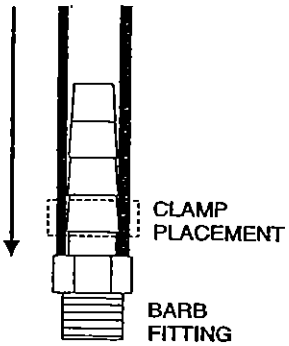
** Special caps available.



*NOTE: Exhaust tubing outlets should be located approx. 1' below well cap or in a location close to the cap where they will not become submerged.



STEP 1. Attach Tubing to Pump



A. Cut back sheathing on tubing set approximately 1 foot.

B. Slip clamps over appropriate tubes prior to connecting to barbs.

C. Push tubing down flush with the fitting's nut if possible; cover at least 3 barbs if 3 or more are present. (Note: in freezing weather, this is easier if tubing is dipped in warm water for a few seconds to soften the nylon.)

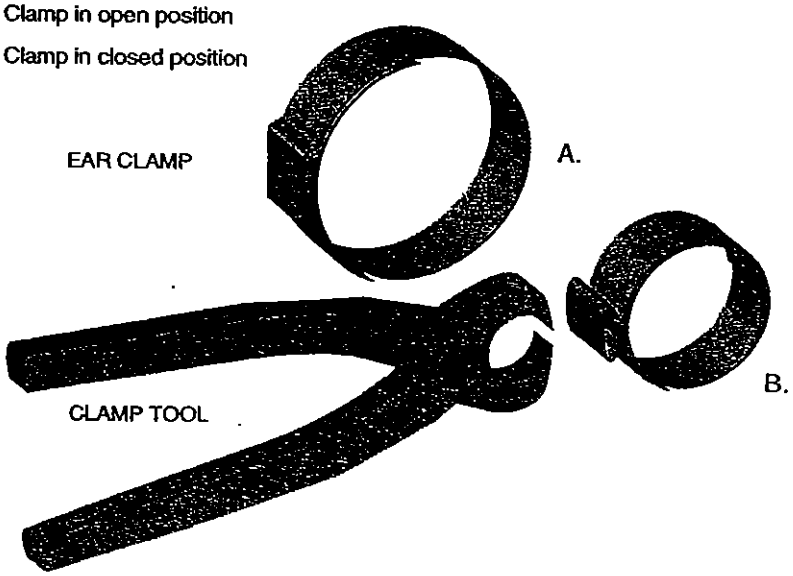
D. Place clamp over lowest barb completely covered by tubing.

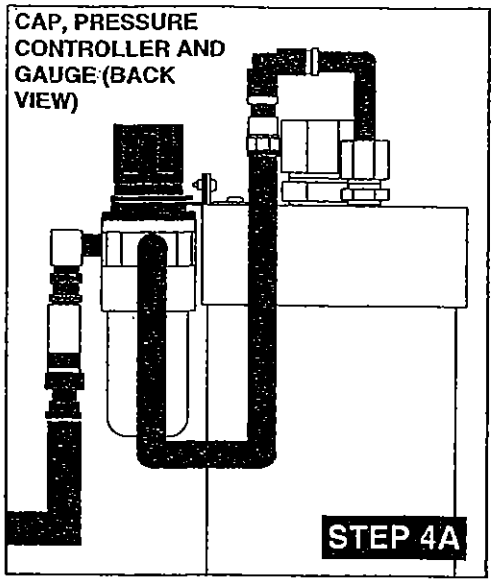
STEP 2. Tighten Clamps

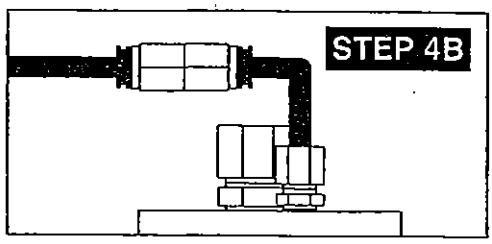
A. Place clamp tool over the dimpled ear portion of the clamp and squeeze ear together (as shown).

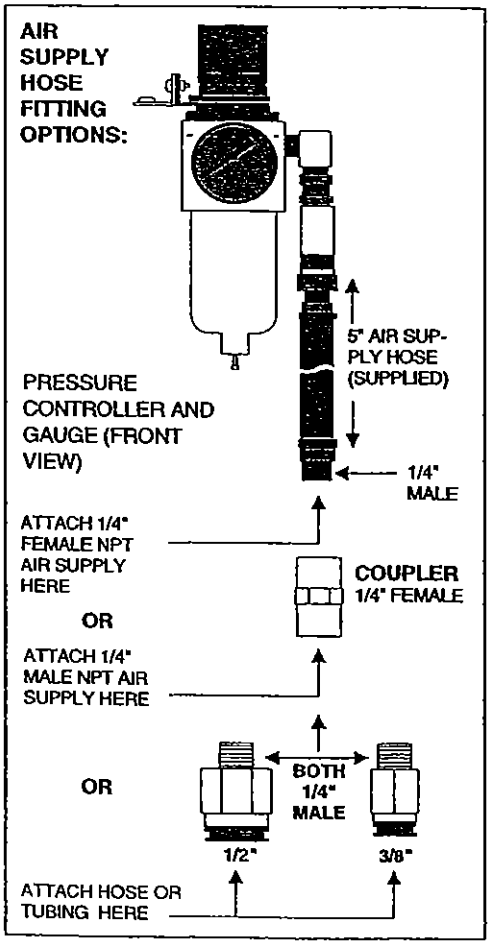
A. Clamp in open position

B. Clamp in closed position









STEP 3. Install Pump in Well

A. Lower pump to desired depth.

B. Once pump depth has been determined, measure off approximately 1 ft. of tubing length (measured from the top of well casing) from the pump exhaust line.

C. Cut exhaust line.

D. Attach the pump exhaust deflector to the pump exhaust line. (See clamp instructions in step 2.)

E. Pass pump discharge and air supply lines through the well cap: place well cap on casing.

F. Re-adjust pump to desired depth.

G. Cut air supply and discharge tubes to desired length.

H. Tighten fittings down onto air/discharge lines, and tighten well cap clamp if present.

STEP 4. Connect Air Supply and Discharge

A. If optional pressure regulator is used, connect short (≈1 foot) hose from regulator to pump air supply line with attached push-on elbow; attach 5' flexible hose to quick-connect fitting on regulator and to air supply line from compressor. See illustration at lower left for air supply hose fitting options.

OR

B. If optional pressure regulator is not used, connect air supply line from compressor directly to pump air supply line above well cap (fittings and coupler for 3/8" and/or 1/2" connections).

C. Connect pump discharge tube to discharge header. (Barb and clamps supplied with pump.)

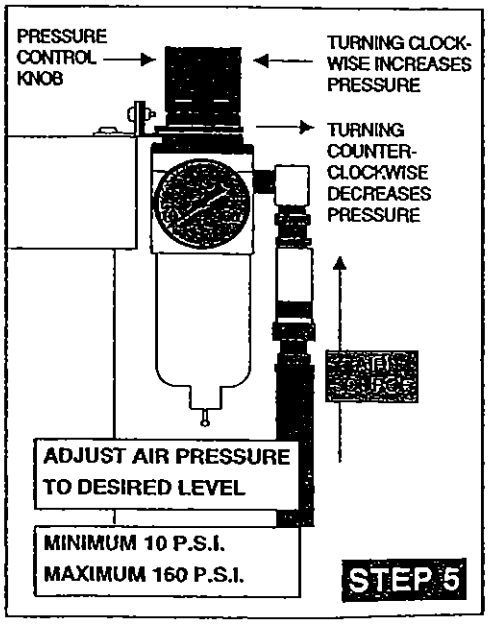
STEP 5. Set Air Pressure

NOTE: Flow Rate is dependent on the amount of air pressure that is received by the pump. Flow rates can be increased by increasing air pressure to the pump or decreased by decreasing air pressure to the pump. For satisfactory performance, pressure should be set at or above 1 psi for every 2 feet of total discharge head—i.e., a pump with T.D.H. of 200' would require 100 psi or more to pump effectively.

A. Adjust air pressure to desired level at compressor—minimum 10 psi, maximum 160 psi.

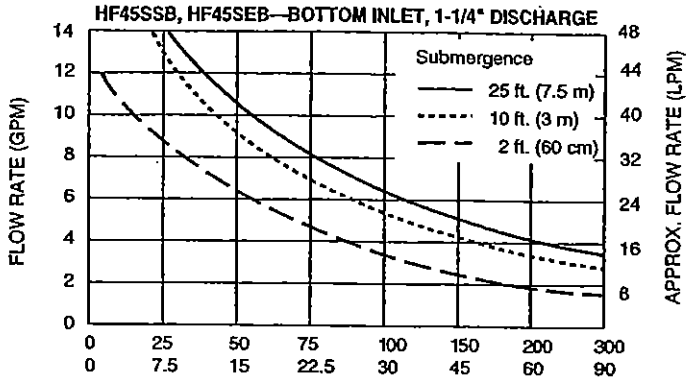
OR

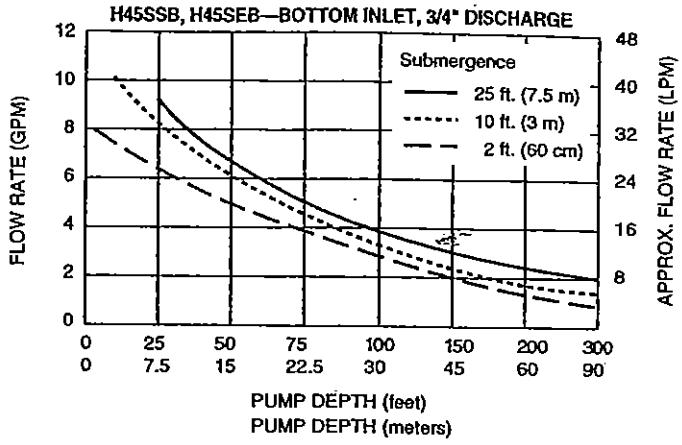
B. Adjust air pressure with optional pressure regulator (see illustration).

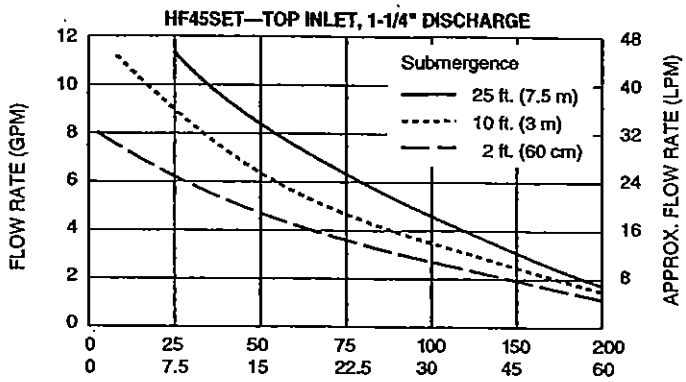


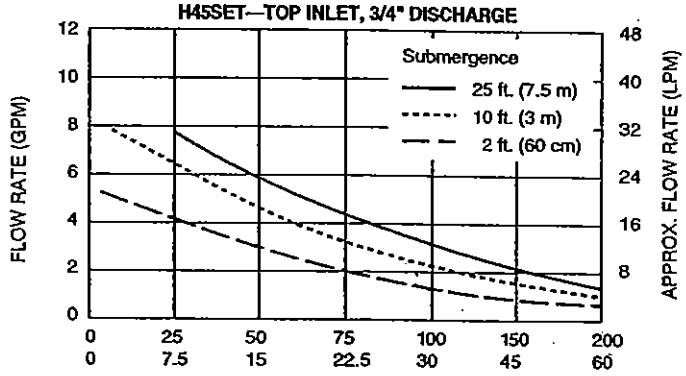
H4 SERIES FLOW PERFORMANCE CURVES

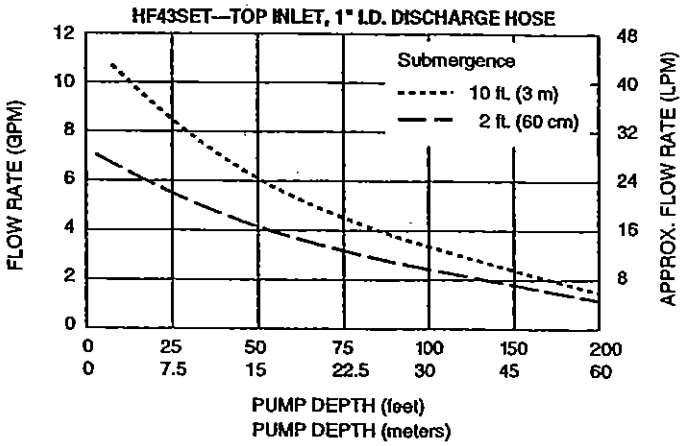
*100 psi (700 kPa) drive air pressure was supplied for all pump depths less than 150 feet (45 meters); 160 psi was supplied for all pump depths greater than 150 feet.











NOTE: Pump depth is measured down from the top of the well casing to the top of the pump fittings. Submergence is measured up from the lowest inlet point on the pump inlet to the top of the static water or product in the well.

~~W~~	~~A~~	Max Pump rate
1 1/4"	= 1.6	12
3/4"	= 0.5	8.
1/2"	= 0.25	~4 ?

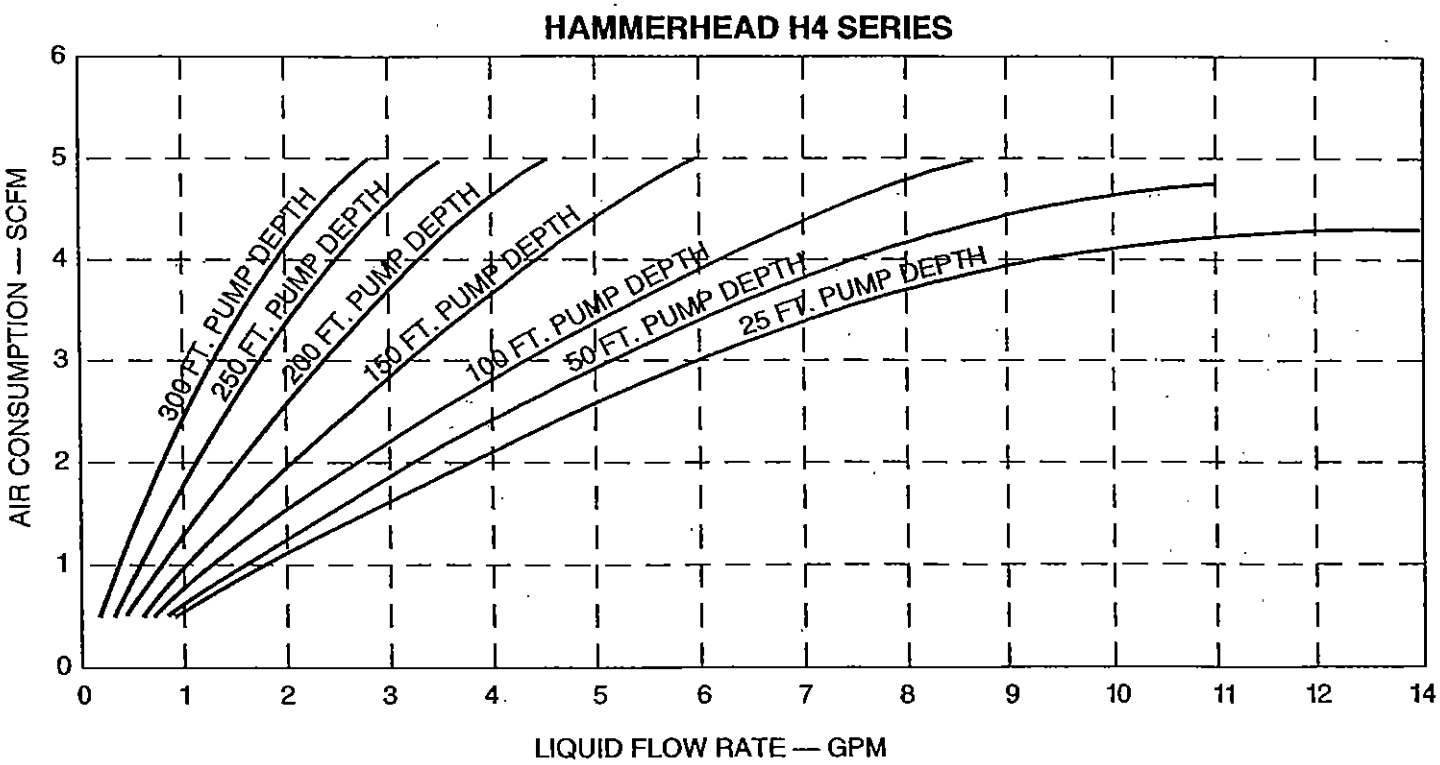
ACCESSORIES

MODEL	PUMP MODEL	DESCRIPTION
37000	All Models	Pump Cycle Counter (for Flow Totalization)
L374	All Models	Tank Full Shutoff
37050	All Models	Kit - Regulator/Gauge
KIH4ST	All Bot. Inlet mod.	Kit - Top Inlet Conversion - H4
KIH4SB	All Top Inlet mod.	Kit - Bottom Inlet Conversion - H4
CH52	All Bot. Inlet mod.	Can - 2' (60 cm) Length (Leachate)
95067	All Models	HammerHead O&M Manual
SPTOOLS	All Models	Clamp Tool, Tube Cutter

MODEL	PUMP MODEL	DESCRIPTION
37058	All Models	Kit - Cable Attachment
37060	All Models	Cable - 3/16" (5 mm) S.S. - order by ft.
37207	All Models	Rope - 3/8" (9 mm) Polypro. - order by ft.
37212	All Models	Cable Sling Assembly
37216	HF4 Series	* Hose - 1" (25 mm) I.D. Discharge (Black)
37217	HF4 Series	* Hose - 3/8" (9 mm) I.D. Air Supply (Red)
37218	HF4 Series	* Hose - 3/8" (9 mm) I.D. Exhaust (Gray)
37208	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Pump
37209	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Well Top
36824	All Models	Flow Throttle Valve

* Hose to be sold with quick connects only

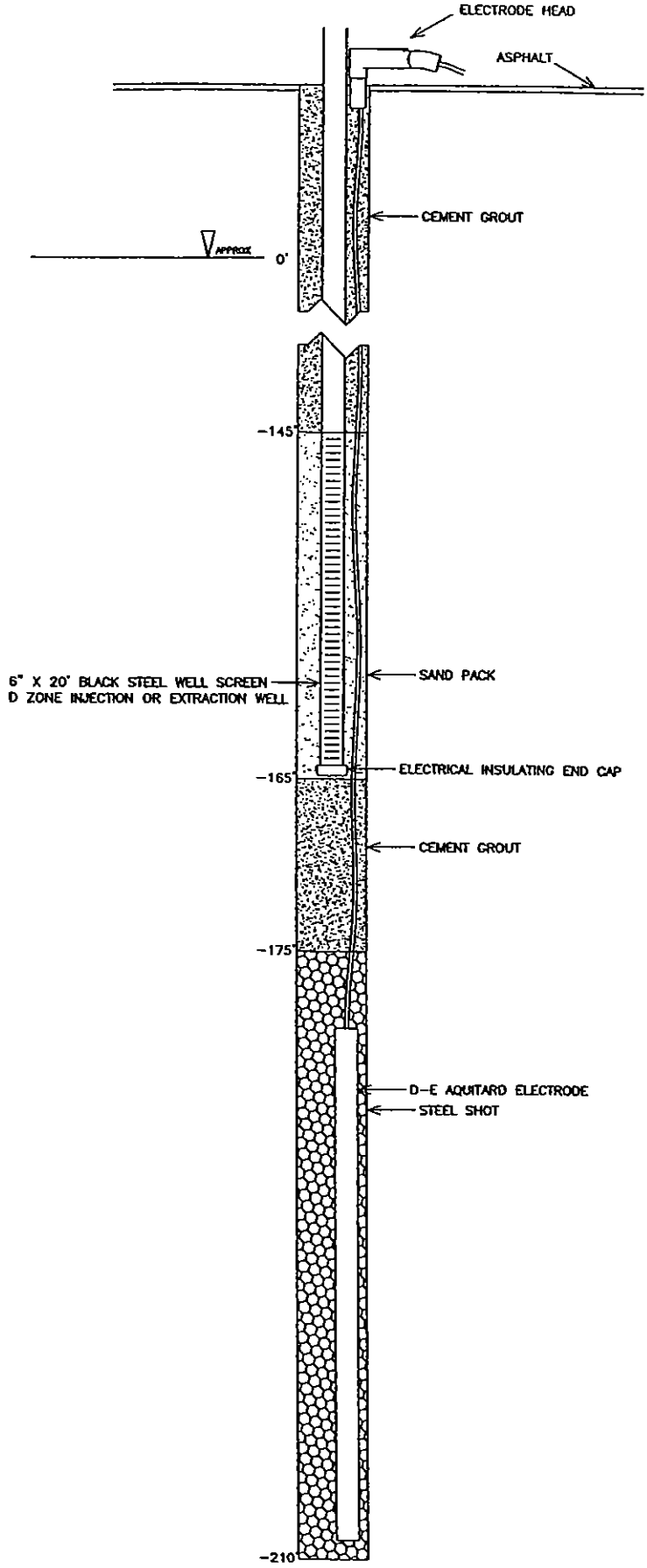
AIR CONSUMPTION



IMPORTANT — AIR FLOW IS ACTUAL. A MAXIMUM "ON-TIME" DUTY CYCLE FOR THE COMPRESSOR MUST BE CONSIDERED IN SELECTING A COMPRESSOR CAPACITY.

MINIMUM AIR FLOW REQUIRED 0.5 SCFM @ 10 PSI
MAXIMUM AIR PRESSURE 160 PSI

HANDOUT #4


ELECTRODE HEAD
ASPHALT
CEMENT GROUT
APPROX
0'
-145'
6" X 20' BLACK STEEL WELL SCREEN
D ZONE INJECTION OR EXTRACTION WELL
SAND PACK
-165'
ELECTRICAL INSULATING END CAP
CEMENT GROUT
-175'
D-E AQUITARD ELECTRODE
STEEL SHOT
-210'

6/20/01

To: Brad Peake QED

From: Jack Spear URS c/o Steamtech (Bakersfield)

12 Commerce Dr.
Cranford, NJ 07016
email: john_spear@urscorp.com

Please quote "budget" pricing for pumps & misc. on next page.

Call if you need.

Bakersfield till 6/21/01 661-322-6478
Cranford after 24th : 908-653-3154

Jack

Brad Peake 800-624-2026

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
1	H4 Hammerhead Pump (bottom loading)	163 EA		
2	H4 Hammerhead Pump (top loading)	20 EA		
4	Air Compressor 600 scfm w/dryer	1 EA		
5	Flexible Tubing (Connection well head to Piping Manifold)	183 EA		
6	Air Tubing (pump to well head) Stainless Steel	14000 LFT		
7	Pulse Counter w/output 4-20 ma signal	163 EA		
8	Pressure transducer w/bubbler probe (ss probe & 1/4" tube)	163 EA		
	(include line to vacuum to record dif. Press.)			
9	Spare parts for 7 years operation	1 ls		

Note: Temperatures in well to 200 deg. F

Bryan Root in Ann Arbor 6/20/01

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
	1 H4 Hammerhead Pump (bottom loading)	163 EA		
	2 H4 Hammerhead Pump (top loading)	20 EA		
	3 Control Panel for up to 205 pumps not needed	1 EA		
	4 Air Compressor 600 cfm needed	1 EA		
	5 Flexible Tubing (Connection well head to ~~Header~~ Manifold at surface)	183 EA		
SS	6 Air Tubing (pump to well head) ~~standard good for 180°F~~	LFT		
	7 Pulse Counter w/output 4-20 ma signal	1 EA		

travel up to 1/4 mile to PLC

8. Level Controller — would use if want to maintain pull pump to level.
do have surface pressure transducer with bubbler probe.
down well SS probe
1/4" SS tube to bubbler probe
line to vac
line to compressor to bubbler
reads dif back press

9. No electrical wiring at all

Local Rep will call
David Courter QED – San Diego – 760-247-6305 hm.&c.

Send to Ann Arbor Fx# 734-995-1170

Attn Brad ~~Peek~~ Peake (Reg Sales Manager)

Dave Corder # telecorder@aol.com
send email

Table 3-8
Summary of Steam, Power, and Water Demand

	Scenario 1	Scenario 2	Scenario 3
Steam demand during 360 day heat-up	93,000 lbs/hr (100 MM BTU/hr gas)	137,000 lbs/hr (150 MM BTU/hr gas)	193,000 lbs/hr (200 MM BTU/hr gas)
Steam demand during years 2-4	75,000 lbs/hr	101,000 lbs/hr	147,000 lbs/hr
Power demand for electrical heating during year 1 and 2	5,100 kW max 2,550 kW avg	7,400 kW max 3,680 kW avg	7,400 kW max 3,680 kW avg
Maximum water supply for steam generation	205 gpm	310 gpm	440 gpm

Table 3-9
Electrical Heating Design Parameters and Power Demand

	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	13
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	35 tons
Estimated Distance Between Electrodes:	60 ft	60 ft
Total Depth of Electrodes:	220 ft bgs	108 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	52 ft MLLW
Electrode Steel Shot Required:	119 tons	54 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control Units:	5,100 kW	2,300 kW
Average Electrical Heating Power Input:	2,550 kW	1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr

Harry Ehlers
06/14/01 09:10 AM

To: John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: Costs for ERH

Jack, I received this from Greg Beyke today.

Harry Ehlers, Project Engineer
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
Harry_Ehlers@urscorp.com
206/438-2700 (office)
206/438-2699 (fax)

—— Forwarded by Harry Ehlers/Seattle/URSCorp on 06/14/01 09:12 AM ——

Greg Beyke <gbeyke@bellsouth.net>
06/14/01 09:12 AM

To: Harry Ehlers <harry_ehlers@urscorp.com>
cc:
Subject: Costs for ERH

Harry,

Please forward this to Jack. He called me on the road Tuesday. This is the first chance I have had to get back to my office and to the Stockton figures. Please pay particular attention to the items in red font - they are either unnecessary (due to being included in some other portion of the cost estimate), or you might have better cost numbers than I.

Call me with the inevitable questions.

Greg

ERH Cost and Summary 6-14.

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only.					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		8,970	$8.00	$71,760	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		237,100	$0.16	$37,936	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$16,671	
Hydrating Solution (lbs/electrode, electro	140	46	$0.40	$2,576	
Metal Electrodes (shipping, electrodes, co	$660	46	$125	$6,428	
Electrode Liquid Conduit		8,970	$1.10	$9,867	
Electrode Heads		46	$25	$1,150	
Subtotal Electrode Materials					$146,400
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	46	40	$75	$138,000	
Forklift to offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		80	$106	$8,480	
TRS Travel, Per Diem, and Car	$2,400	10	$106	$3,460	
Drill Cutting Waste Disposal (tons,$/ton)		50	$250	$12,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		14	$133	$1,862	
Subtotal Other Electrode Installation Costs					$165,200
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		60	$106	$6,360	
PCS Preliminary Design and Specifications		60	$143	$8,580	
PCS Cost (kW,$/kW)		5,100	$115	$586,500	
PCS Shipping (mi,$/mi)		2800	$3.50	$9,800	
Miscellaneous Shipping	$1,000			$1,000	
Crane to Offload PCS	$2,000			$2,000	
Mobilization Labor		24	$101	$2,424	
PCS Pad and Building (sq.ft., $/sq.ft.)		700	$13.25	$9,275	
TRS Senior Project Manager		6	$133	$798	
Subtotal Power Control System (PCS) Purchase and Mobilization					$626,700
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$3,450	16560	$2.25	$40,710	
Cable Shipping		1500	$1.75	$2,625	
Electrode Wetting System Materials	$4,480			$4,480	
Grounding System Materials ($, feet, $/ft)	$2,760	3,680	$1.10	$6,808	
Subtotal ERH System Construction Materials and Shipping					$54,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		115	$101	$11,615	
PCS Testing		80	$106	$8,480	
Electrode Wetting System Labor		46	$80	$3,680	
Telephone Installation				$500	
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$16,000			$16,000	
TRS Travel, Per Diem, and Car	$3,200	40	$106	$7,440	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		6	$143	$858	

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$93,900
Start-up Labor					
Electrical Specialist		172	$101	$17,372	
Staff Professional		172	$106	$18,232	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		20	$143	$2,860	
Professional Travel and Per Diem	$4,400	50	$106	$9,700	
Subtotal Start-up Labor					$54,300
ERH System Operations and Reporting (per week)					
Electrical Specialist		40	$101	$4,040	
Staff Professional		15	$106	$1,590	
Repair/Consumable Materials	$300			$300	
TRS Senior Project Manager		7	$133	$931	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$300	3.0	$101	$603	
ERH Operations (per week)				$7,890	
Total ERH Operations Cost (weeks, $/week)		100	$7,890		$786,600
Electrical Usage		########	$0.053		$2,347,700
Demobilization and Salvage					
Planning		80	$133	$10,640	
Forklift/Crane	$2,000			$2,000	
Trash Disposal	$500	3	$80	$740	
Electrical Specialist		160	$101	$16,160	
Staff Professional		40	$106	$4,240	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$900	10	$101	$1,910	
PCS Salvage Value		$586,500	-15%	-$87,975	
Cable Salvage Value		$37,260	-30%	-$11,178	
Subtotal Demobilization and Salvage					-$61,700
Final Reporting					
Electrical Specialist		40	$101	$4,040	
Staff Professional		120	$106	$12,720	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		40	$143	$5,720	
Travel, Per Diem, and Car	$2,400	20	$101	$4,420	
Subtotal Final Reporting					$29,600

Total ERH Cost ########

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only. Well pumps and casing are not included - assumed to be part of Scenario 1 (base case)

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
1) Electrode Installation					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		2,070	$8.00	$16,560	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		66,300	$0.16	$10,608	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$5,226	
Hydrating Solution (lbs/electrode, electro	200	9	$0.40	$720	
Metal Electrodes (shipping, electrodes, co	$380	18	$181	$3,632	
Electrode Liquid Conduit		1,350	$1.10	$1,485	
Electrode Heads		9	$25	$225	
Subtotal Electrode Materials					$38,500
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	9	25	$75	$16,875	
Barge for Drilling	included in Scenario 1				
Drilling Overcasing	included in Scenario 1				
Cable and Hose Floats	included in Scenario 1				
Forklift to Offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		40	$106	$4,240	
TRS Travel, Per Diem, and Car	$1,600	10	$106	$2,660	
Drill Cutting Waste Disposal (tons,$/ton)		6	$250	$1,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		8	$133	$1,064	
Subtotal Other Electrode Installation Costs					$27,300
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		20	$106	$2,120	
PCS Preliminary Design and Specifications		20	$143	$2,860	
PCS Cost (kW,$/kW)		2,300	$115	$264,500	
PCS Shipping (mi,$/mi)		2800	$1.75	$4,900	
Miscellaneous Shipping	$500			$500	
Crane to Offload PCS	$500			$500	
Mobilization Labor		4	$101	$404	
PCS Pad and Building (add. sq.ft., $/sq.ft.)		200	$13.25	$2,650	
TRS Senior Project Manager		3	$133	$399	
Subtotal Power Control System (PCS) Purchase and Mobilization					$278,800
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$675	3996	$2.25	$9,666	
Cable Shipping		1500	$0.25	$375	
Electrode Wetting System Materials	$1,520			$1,520	
Grounding System Materials ($, feet, $/ft)	$0	0	$1.10	$0	
Subtotal ERH System Construction Materials and Shipping					$11,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		23	$101	$2,323	
PCS Testing		20	$106	$2,120	
Electrode Wetting System Labor		9	$80	$720	
Telephone Installation				$500	

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$4,000			$4,000	
TRS Travel, Per Diem, and Car	$1,600	20	$106	$3,720	
TRS Senior Project Manager		12	$133	$1,596	
Supervising Professional		2	$143	$286	
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$55,300
Start-up Labor					
Electrical Specialist		86	$101	$8,686	
Staff Professional		86	$106	$9,116	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		10	$143	$1,430	
Professional Travel and Per Diem	$1,800	20	$106	$3,920	
Subtotal Start-up Labor					$26,100
ERH System Operations and Reporting (per week)					
Electrical Specialist		0	$101	$0	
Staff Professional		8	$106	$848	
Repair/Consumable Materials	$150			$150	
TRS Senior Project Manager		4	$133	$532	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$200	2.0	$101	$402	
ERH Operations (per week)				$2,220	
Total ERH Operations Cost (weeks, $/week)		100	$2,220		$221,300
Electrical Usage		#########	$0.053		$1,037,700
Demobilization and Salvage					
Planning		20	$133	$2,660	
Forklift/Crane	$0			$0	
Trash Disposal	$100	1	$80	$180	
Electrical Specialist		40	$101	$4,040	
Staff Professional		20	$106	$2,120	
TRS Senior Project Manager		5	$133	$665	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$800	10	$101	$1,810	
PCS Salvage Value		$264,500	-15%	-$39,675	
Cable Salvage Value		$8,991	-30%	-$2,697	
Subtotal Demobilization and Salvage					-$30,600
Final Reporting					
Electrical Specialist		20	$101	$2,020	
Staff Professional		60	$106	$6,360	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		20	$143	$2,860	
Travel, Per Diem, and Car	$1,200	10	$101	$2,210	
Subtotal Final Reporting					$14,800
Total ERH Cost					########

Table 1 - Remediation Parameters and Cost

Site Name:	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	9
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	6 tons
Estimated Distance Between Electrodes:	60 ft	74 ft
Total Depth of Electrodes:	220 ft bgs	105 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	55 ft MLLW
Electrode Steel Shot Required:	119 tons	33 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control System (PCS):	5,100 kW	2,300 kW
Average Electrical Heating Power Input:		1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr
Electrode Materials and Shipping	$146,400	$38,500
Other Electrode Installation Costs	$165,200	$27,300
PCS Purchase and Mobilization	$626,700	$278,800
ERH System Materials and Shipping	$54,600	$11,600
Labor and Other ERH System Construction Costs	$93,900	$55,300
Start-up Labor	$54,300	$26,100
ERH Operations Cost	$786,600	$221,300
Electrical Usage (at $0.053 per kW-hr)	$2,347,700	$1,037,700
Demobilization and Salvage	-$61,700	-$30,600
Final Reporting	$29,600	$14,800
	$4,243,300	**$1,680,800**

"Steam Tech" <heron@steamtech.com>

07/07/01 06:59 PM

To: John_Spear@URSCorp.com, carroll@steamtech.com
cc: "Susan Schima" <schima@steamtech.com>, sowers@steamtech.com, Harry_Ehlers@URSCorp.com
Subject: Re: VEA & DPT questions

>
> "Susan
> Schima" To: John_Spear@URSCorp.com
> <schima@steam cc: heron@steamtech.com,
sowers@steamtech.com
> tech.com> Subject: Re: Questions &
comments on text
>
> 07/06/2001
> 04:14 PM
>
>
>
>
>
>
>
> Dear Jack,
>
> Below are some costing estimates involved with an ERT survey. These are
> ballpark figures, based on current market values for materials and
> equipment rentals. Please do not hesitate to email me for any further
> questions or for more details on the costing breakdown.
>
> You might expect the general costs for fabricating and operating an ERT and
> temperature survey to include the following:
>
> VEA Fabrication with Thermocouples: $150 per 10 ft, assuming one
> electrode
> and two thermocouples per 10 ft, includes labor and materials
>
> Data Collection Hardware: $300 per day
>
> Mob/Demob: $3000
>
> Labor:
> Data Collection: $300 per day
> Processing Data: $160 per day
> Imaging Data: $145 per day
>
> Note the VEA cost estimate is PER 10 FT. This includes the material costs,
> such as Teflon wire, fiberglass rod, stainless steel electrode, etc, and
> labor for one supervisor and one technician. So, for a single VEA at 120 ft
> depth, the cost might be around $1800.
>
> Also, the VEA cost was based on CPT push. You may need to add more for
> drilling.
>
> Please see Table 6.1.1 for proposed schedule of data collection days to
> estimate grand total for that.
>
>
>
> Distributed Temperature Sensing (DTS) might break down as follows:
>
> Fiber Optic Cable: expect $2.50 per ft for the high temperature, durable,
> coated cable
>
> Data Collection Equipment: $70,000.00 to buy, $6,000 per month lease
>

>
>
>
> Sincerely,
> Susan
>
>
>
>
>

MB-replies-Jack-July7.do

Hello Jack,

I will try to answer your questions, since I will be on the road until Thursday morning.

Jacvk: I must be really stupid but I still don't understand this whole system and Table 6.1.1 also confuses me somewhat. Do we have the fiber optic DPT system? It isn't mentioned in Section 6.1 of the text but is in Appendix D. I had thought that the idea was played with but wasn't part of this CD.

Gorm: Don't worry, we know you are a bright fella. Yes we plan to include DTS in the design. Susan, please review the text and make sure that we present this design.

Jack: Regarding the VEA in operation. Will the operators at the site (we currently have two full time 24 hours/day plus a technical person 8 hours per day during thermal and cool down phases in the estimate) be able to provide the labor that Susan mentions to operate and monitor the VEA system or do we need the additional at the rates quoted below for data collection, processing data and imaging data?

Gorm: Please assume that the operators can run the DTS as well.

Jack: What additional system/hardware/software besides our computer system priced for the site operators office do we need to collect and report the data from the VEA array? Susan mentions a pretty expensive data collection system for the DPT which if we need I will add to the estimate but I'm not sure what else. Gorm gave me a table with the linear ft of VEA needed and I have priced installation including grouting of this in the estimate but I have not received anything about the DPT system and how it is installed. If we don't use the fiber optic wire is there some other temperature sensing system that will be installed?

Will a data collection and some kind of power wire be needed for every electrode going back to the operations office? What is the number of electrodes? (Perhaps the number is on a table somewhere and I have forgotten where.) .

Gorm: We need a DTS system (70k). The fiberoptic cable and ERT electrodes with wires should be included in the cost per 10 ft provided by Susan.

Jack: As for Table 6.1.1 what are the "new P&T" extraction wells and monitoring wells? Is this a left over from the time we were planning to P&T for 20 or more years after the cool down or are these the extraction and monitoring wells we still have in the system?

Gorm: They are the NAPL recovery and hydraulic control wells located outside the thermal treatment area, as designed by Mike Bailey.

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25. START UP, TESTING, O&M PLAN								
3300.25. 5. O&M MANUAL								
3300.25. 5.10. PCS Commissioning Manual								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00 EA	4,268	0	0	0	500	4,768	4768.00
3300.25. 5.13. Preliminary Draft - O&M Manual Spec Section 01830								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Site Superintendant		61.99	0.00	0.00	0.00	0.00	61.99	
	8.00 HR	496	0	0	0	0	496	61.99
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I; Project Manager	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol Officer	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III Health and Safety Manager (CIH)	4.00 HR	414	0	0	0	0	414	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preliminary Draft - O&M Manua	1.00	EA	23,239	0	0	0	600	23,839	23839.48
3300.25. 5.18. Revised Draft - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	20.00	HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	4.00	HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	8.00	HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	8.00	HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00	EA	7,955	0	0	0	600	8,555	8555.20
3300.25. 5.23. Final - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	8.00	HR	730	0	0	0	0	730	91.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	2.00	HR	169	0	0	0	0	169	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00	HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	1.00	HR	103	0	0	0	0	103	103.40
Health and Safety Manager (CIH)									
USR AA Technician VI - Plant Operato			35.42	0.00	0.00	0.00	0.00	35.42	
r	20.00	HR	708	0	0	0	0	708	35.42
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	4.00	HR	238	0	0	0	0	238	59.40
TOTAL Final - O&M Manual	1.00	EA	5,280	0	0	0	600	5,880	5880.00
TOTAL O&M MANUAL	1.00	JOB	40,743	0	0	0	2,300	43,043	43042.68
3300.25.10. STARTUP/COMMISSION TREATMENT SYS									
3300.25.10. 5. ENGINEERS & TECHNICIANS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	80.00	HR	8,272	0	0	0	0	8,272	103.40
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
-	320.00	HR	23,232	0	0	0	0	23,232	72.60
Startup/Proveout Project Manager									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	240.00	HR	21,912	0	0	0	0	21,912	91.30
P&ID Checkout									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	80.00	HR	7,304	0	0	0	0	7,304	91.30
I&E Checkout									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	120.00	HR	10,956	0	0	0	0	10,956	91.30
PC/MMI Checkout									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00	HR	18,260	0	0	0	0	18,260	91.30
PC/MMI Programmer									

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00	HR	18,260	0	0	0	0	18,260	91.30
Startup Engineer									
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
-	16.00	HR	1,355	0	0	0	0	1,355	84.70
Director QA/QC									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Technician/Analyst IV -			33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	40.00	HR	1,320	0	0	0	0	1,320	33.00
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00	HR	6,776	0	0	0	0	6,776	84.70
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	1120.00	HR	59,506	0	0	0	0	59,506	53.13
USR AA GWTP Plant Operator			43.47	0.00	0.00	0.00	0.00	43.47	
	600.00	HR	26,082	0	0	0	0	26,082	43.47
MIL AA Electricians			35.93	0.00	0.00	0.00	0.00	35.93	
	80.00	HR	2,874	0	0	0	0	2,874	35.93
USR AA Vendor/Manufacturers Reps;			0.00	0.00	0.00	4000.00	0.00	4000.00	
Installation and Startup	8.00	EA	0	0	0	32,000	0	32,000	4000.00
USR AA Site QC/HSO			43.47	0.00	0.00	0.00	0.00	43.47	
	270.00	HR	11,737	0	0	0	0	11,737	43.47
USR AA Electrical Specialist			0.00	0.00	0.00	101.00	0.00	101.00	
	172.00	HR	0	0	0	17,372	0	17,372	101.00
USR AA Staff Professional			0.00	0.00	0.00	106.00	0.00	106.00	
	172.00	HR	0	0	0	18,232	0	18,232	106.00
USR AA TRS Sr. Project Manager			0.00	0.00	0.00	0.00	0.00	0.00	
	40.00	HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional			0.00	0.00	0.00	143.00	0.00	143.00	
	20.00	HR	0	0	0	2,860	0	2,860	143.00
USR AA TRS Trave, Per Diem			0.00	0.00	0.00	9700.00	0.00	9700.00	
	1.00	LS	0	0	0	9,700	0	9,700	9700.00
TOTAL ENGINEERS & TECHNICIANS	1.00	JOB	220,750	0	0	80,164	0	300,914	300913.96

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.10. TRAVEL & PER DIEM								
USR AA Mileage on Personal Car, Trip		0.00	0.00	0.00	0.00	0.31	0.31	
s	16000 MI	0	0	0	0	4,960	4,960	0.31
for O&M Proj Mgr from office.								
USR AA Apartments for site personnel		0.00	0.00	0.00	0.00	1600.00	1600.00	
Mgr and HSO.	8.00 MO	0	0	0	0	12,800	12,800	1600.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	120.00 DAY	0	0	0	0	5,040	5,040	42.00
USR AA Airfare Trips for Vendor Reps		0.00	0.00	0.00	0.00	500.00	500.00	
and Instrumentation and	10.00 EA	0	0	0	0	5,000	5,000	500.00
Electrical Engineering								
personnel.								
USR AA Rental Car, Total of 4 cars f		0.00	0.00	0.00	0.00	45.00	45.00	
or	80.00 DAY	0	0	0	0	3,600	3,600	45.00
two months.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	20.00 EA	0	0	0	0	400	400	20.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	31,800	31,800	31800.00
3300.25.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot		0.00	0.00	5000.00	0.00	0.00	5000.00	
hes	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	4.00 MO	0	5,200	0	0	800	6,000	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P		0.00	7.52	0.00	0.00	0.00	7.52	
KUP	640.00 HR	0	4,814	0	0	0	4,814	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	10,014	5,000	0	800	15,814	15814.02
3300.25.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine		0.00	0.00	0.00	0.00	35.00	35.00	
	2.00 MO	0	0	0	0	70	70	35.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	3.00 MO	0	0	0	0	225	225	75.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	2.00 MO	0	800	0	0	0	800	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	3000.00	0.00	0.00	3000.00	
	2.00 LS	0	0	6,000	0	0	6,000	3000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 MO	0	0	0	400	0	400	200.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	400.00	0.10	400.10	
	2.00 MO	0	0	0	800	0	800	400.10
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	1,600	6,800	1,200	13,395	22,995	22995.20

3300.25.10.26. OPERATING/PROCESS UTILITIES
Assume 1.5 Megawatt-Hrs per day or 62.5 KW per hour @ $0.053/KW.

USR AA Natural Gas, 120 mmbtu/hour @		0.00	0.00	0.00	0.00	400.00	400.00	
1050 btu/scft @ $3.50/MCFT	100.00 HR	0	0	0	0	40,000	40,000	400.00
USR AA Electircity for Electrodes:		0.00	0.00	0.00	0.00	83.30	83.30	
Assume 20 megawatt/day or 833	100.00 HR	0	0	0	0	8,330	8,330	83.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	6.25	6.25	
ent	100.00 HR	0	0	0	0	625	625	6.25
Plant, Steam:								
USR AA Water @ 300 gpm or 18 kgal/ho		0.00	0.00	0.00	0.00	19.20	19.20	
ur	100.00 HR	0	0	0	0	1,920	1,920	19.20
= 24 units/hour @ $0.80								
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	2.00 MO	0	0	0	0	396	396	198.00
TOTAL OPERATING/PROCESS UTILITIES	1.00 JOB	0	0	0	0	51,271	51,271	51271.00
3300.25.10.30. CHEMICALS								
USR AA GAC (Liquid); average useage		0.00	0.00	1.87	0.00	0.00	1.87	
35	1050.00 LB	0	0	1,964	0	0	1,964	1.87
lb/day x 30 days operation								
USR AA GAC (Air); 40 lb/ day x 30 da		0.00	0.00	2.30	0.00	0.00	2.30	
ys	1200.00 LB	0	0	2,760	0	0	2,760	2.30
operation = 1200 lb.								
USR AA Alum		0.00	0.00	2.00	0.00	0.00	2.00	
	1050.00 LB	0	0	2,100	0	0	2,100	2.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10000 LB	0	0	1,500	0	0	1,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Polymer, One 55 gal drum/mo.		0.00	0.00	1.78	0.00	0.00	1.78	
	135.00 LB	0	0	240	0	0	240	1.78
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	1500.00 LB	0	0	60	0	0	60	0.04
TOTAL CHEMICALS	1.00 JOB	0	0	8,624	2,000	0	10,624	10623.80

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filter A		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter B		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter C Cartridges		0.00	0.00	21.20	0.00	0.00	21.20	
	230.00 EA	0	0	4,876	0	0	4,876	21.20
USR AA Filter D		0.00	0.00	6.70	0.00	0.00	6.70	
	24.00 EA	0	0	161	0	0	161	6.70
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	6,109	0	0	6,109	6108.80
3300.25.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	3.00 MO	0	1,350	0	0	0	1,350	450.00
USR AA LEL		0.00	200.00	0.00	0.00	0.00	200.00	
	3.00 MO	0	600	0	0	0	600	200.00
USR AA PPE - Level D Modified		0.00	0.00	2400.00	0.00	0.00	2400.00	
	1.50 MO	0	0	3,600	0	0	3,600	2400.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	1,950	3,600	0	0	5,550	5550.00
3300.25.10.45. DISPOSALS STARTUP								
USR AA Sludge Disposal		0.00	0.00	0.00	420.00	0.00	420.00	
	50.00 DRM	0	0	0	21,000	0	21,000	420.00
USR AA Sludge Waste Characterization - Full TCLP & Waste Char. for Carbon (liquid and vapor) and sludge.		0.00	0.00	0.00	0.00	665.00	665.00	
	2.00 EA	0	0	0	0	1,330	1,330	665.00
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	240.00 GAL	0	0	0	475	0	475	1.98
TOTAL DISPOSALS STARTUP	1.00 JOB	0	0	0	21,475	1,330	22,805	22805.20

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.50. PERSONNEL TRAINING								
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00 HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	40.00 HR	2,125	0	0	0	0	2,125	53.13
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -		33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00 HR	528	0	0	0	0	528	33.00
USR AA Misc Materials		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00 JOB	8,510	0	500	0	0	9,010	9009.60
3300.25.10.55. SAMPLING/ANALYSIS; STARTUP								
3300.25.10.55.05. DATA VALIDATION								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	27.00 HR	1,604	0	0	0	0	1,604	59.40
TOTAL DATA VALIDATION	1.00 JOB	1,604	0	0	0	0	1,604	1603.80

3300.25.10.55.30. ANALYTICALS PROCESS
Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	13.00 EA	0	0	1,287	0	0	1,287	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	26.00 EA	0	0	131	0	0	131	5.02

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M HTW AA TAL Metals		0.00	0.00	80.00	0.00	0.00	80.00	
	18.00 EA	0	0	1,440	0	0	1,440	80.00
HTW AA TCL VOC (SW-846, 8260B)		0.00	0.00	296.00	0.00	0.00	296.00	
Includes 4 trip blanks.	22.00 EA	0	0	6,512	0	0	6,512	296.00
M HTW AA TPH EPA 418.1		0.00	0.00	120.00	0.00	0.00	120.00	
	18.00 EA	0	0	2,160	0	0	2,160	120.00
HTW AA TCL SVOC (SW-846, 8270C)		0.00	0.00	564.00	0.00	0.00	564.00	
	18.00 EA	0	0	10,152	0	0	10,152	564.00
HTW AA Suspended Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
HTW AA Dissolved Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	280.00	0.00	0.00	280.00	
	18.00 EA	0	0	5,040	0	0	5,040	280.00
TOTAL ANALYTICALS PROCESS	1.00 JOB	0	0	32,124	0	0	32,124	32123.52
3300.25.10.55.40. BOILER AIR EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	5.00 EA	0	0	0	1,375	0	1,375	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
USR AA VOC's		0.00	0.00	0.00	60.00	0.00	60.00	
	5.00 EA	0	0	0	300	0	300	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	5.00 EA	0	0	0	175	0	175	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	5.00 EA	0	0	0	500	0	500	100.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	10.00 EA	0	0	990	0	0	990	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	10.00 EA	0	0	50	0	0	50	5.02
USR AA Tedlar Bags		0.00	0.00	10.00	0.00	0.00	10.00	
	100.00 EA	0	0	1,000	0	0	1,000	10.00
TOTAL BOILER AIR EMISSIONS	1.00 JOB	0	0	2,040	7,500	0	9,540	9540.20
3300.25.10.55.45. VAPOR PH GAC EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	2.00 EA	0	0	0	550	0	550	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	2.00 EA	0	0	0	1,900	0	1,900	950.00
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	2.00 EA	0	0	0	120	0	120	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	2.00 EA	0	0	0	70	0	70	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	2.00 EA	0	0	0	200	0	200	100.00
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA CO		0.00	0.00	0.00	115.00	0.00	115.00	
	2.00 EA	0	0	0	230	0	230	115.00
USR AA SOx		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00
USR AA NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00	EA	0	0	396	0	0	396	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00	EA	0	0	20	0	0	20	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	25.00	EA	0	0	250	0	0	250	10.00
TOTAL VAPOR PH GAC EMISSIONS	1.00	JOB	0	0	666	3,830	0	4,496	4496.08
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00	JOB	1,604	0	34,830	11,330	0	47,764	47763.60
3300.25.10.60. SOURCE TEST									
USR AA Source Test			0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL SOURCE TEST	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL STARTUP/COMMISSION TREATMENT	1.00	JOB	230,863	13,564	65,462	146,169	98,596	554,655	554655.18
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	271,606	13,564	65,462	146,169	100,896	597,698	597697.86

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30. DEMOBILIZATION									
3300.30.21. DEMOBILIZATION									
3300.30.21.01. Removal of Temp Facilities									
USR AA Demobe Contractor Ofc Trailer			0.00	0.00	0.00	200.00	0.00	200.00	
	2.00	LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer			0.00	0.00	0.00	200.00	0.00	200.00	
	1.00	LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer			0.00	0.00	0.00	100.00	0.00	100.00	
	1.00	LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit y Post Abatement Clean Up			187.66	19.73	25.00	0.00	0.00	232.39	
	1.00	EA	188	20	25	0	0	232	232.39
USR AA Removel Water Supply			0.00	0.00	0.00	500.00	0.00	500.00	
	1.00	EA	0	0	0	500	0	500	500.00
USR AA Remove Furniture in Temp Off ice			0.00	0.00	0.00	250.00	0.00	250.00	
	1.00	LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Remova l; 01770			284.24	87.95	0.00	0.00	0.00	372.20	
	4.00	AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00	JOB	1,325	372	25	1,450	0	3,171	3171.18
3300.30.21.02. Removal of Temp Utilities									
USR AA Remove Temp Electricity			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL Removal of Temp Utilities	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
3300.30.21.04. Demobe of Construction Equipment									
USR AA Demobe Heavy Equipment			0.00	0.00	0.00	0.00	200.00	200.00	
	5.00	EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00	JOB	0	0	0	0	1,000	1,000	1000.00
TOTAL DEMOBILIZATION	1.00	JOB	1,325	372	25	11,450	1,000	14,171	14171.18

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22. REPORTS, CLOSEOUT									
3300.30.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	4,356	0	0	0	600	4,956	4956.00
3300.30.22.10. Record Drawings									
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	20.00	EA	0	0	0	0	1,000	1,000	50.00
USR AA Senior Engineer/Scientist I - Draftsman	400.00	HR	67.10 26,840	0.00 0	0.00 0	0.00 0	0.00 0	67.10 26,840	67.10
USR AA Senior Engineer/Scientist II; Site Superintendant	160.00	HR	72.60 11,616	0.00 0	0.00 0	0.00 0	0.00 0	72.60 11,616	72.60
USR AA Construction Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	80.00	HR	7,304	0	0	0	0	7,304	91.30
TOTAL Record Drawings	1.00	JOB	45,760	0	0	0	1,000	46,760	46760.00
3300.30.22.15. Chemical Data Final Report									
USR AA Senior Engineer/Scientist IV - Chem Qual Control Officer	16.00	HR	84.70 1,355	0.00 0	0.00 0	0.00 0	0.00 0	84.70 1,355	84.70
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV; Project Chemist	80.00	HR	84.70 6,776	0.00 0	0.00 0	0.00 0	0.00 0	84.70 6,776	84.70
TOTAL Chemical Data Final Report	1.00	JOB	8,439	0	0	0	600	9,039	9039.20

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22.20. Remedial Action Report									
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	100.00	HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	400.00	HR	16,720	0	0	0	0	16,720	41.80
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	400.00	HR	33,880	0	0	0	0	33,880	84.70
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	400.00	HR	19,360	0	0	0	0	19,360	48.40
USR AA ODC's			0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00	LS	0	0	0	0	1,000	1,000	1000.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	80.00	HR	3,080	0	0	0	0	3,080	38.50
TOTAL Remedial Action Report	1.00	JOB	83,380	0	0	0	1,000	84,380	84380.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	141,935	0	0	0	3,200	145,135	145135.20
TOTAL DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL CAPITAL COSTS	1.00	JOB	6,242,211	254,782	8,459,454	11036883	673,823	26,667,153	26667153.28

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400. 1ST YEAR O&M								
3400. 5. GENERAL CONDITIONS								
3400. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3400. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3400. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3400.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3400.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3400.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3400.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	40,080	40,000	0	80,080	6673.33

3400.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	1906935 MBT	0	0	0	0	6,674,273	6,674,273	3.50
@ $3.50								
USR AA Electricity for Electrodes		0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	22347 KKW	0	0	0	0	1,340,820	1,340,820	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	22347 KKW	0	0	0	0	-1340820	-1,340,820	-60.00
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	12264 KKW	0	0	0	0	735,840	735,840	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	210240 UNT	0	0	0	0	168,192	168,192	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	7,585,481	7,585,481	632123.38

Table 4-4
Utility Estimates for Different Phases of Operation for Each Scenario

Fresh water usage estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	200	300	400	gpm	100% fresh water					
Continued thermal treatment	Year 2	133	200	267	gpm	67% fresh water					
Continued thermal treatment	Year 3	100	150	200	gpm	50% fresh water					
Continued thermal treatment	Year 4	100	150	200	gpm	50% fresh water					
Cool-down	Year 5	10	15	20	gpm	100% fresh water					
Cool-down	Year 6	10	15	20	gpm	100% fresh water					
Cool-down	Year 7	10	15	20	gpm	100% fresh water					
Treatment system pumping capacity	Maximum	475	575	700	gpm						
Steam generation water demand	Maximum	200	300	400	gpm						
						General process power			Electrical heating demand		
Power consumption estimates		Scenario 1	Scenario 2	Scenario 3		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Heatup	Year 1	3,550	5,080	5,480	kW	1,000	1,400	1,800	2,550	3,680	3,680
Continued thermal treatment	Year 2	3,551	5,080	5,480	kW	1,000	1,400	1,800	2,551	3,680	3,680
Continued thermal treatment	Year 3	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Continued thermal treatment	Year 4	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Cool-down	Year 5	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 6	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 7	500	650	800	kW	500	650	800	0	0	0
Max power usage for equipment sizing	Maximum	6,600	9,400	9,900	kW	1,500	2,000	2,500	5,100	7,400	7,400
Natural gas consumption estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	152,381	228,571	304,762	scfh	80% firing rate in average					
Continued thermal treatment	Year 2	133,333	200,000	266,667	scfh	70% firing rate					
Continued thermal treatment	Year 3	114,286	171,429	228,571	scfh	60% firing rate					
Continued thermal treatment	Year 4	95,238	142,857	190,476	scfh	50% firing rate					
Cool-down	Year 5	0	0	0	scfh	No steam generation					
Cool-down	Year 6	0	0	0	scfh	No steam generation					
Cool-down	Year 7	0	0	0	scfh	No steam generation					

Table 4-5
Estimation of Consumption of Grid Power During Operation

Total power consumption		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	3550	5080	5480	kW
Continued thermal treatment	Year 2	3551	5080	5480	kW
Continued thermal treatment	Year 3	800	1000	1200	kW
Continued thermal treatment	Year 4	800	1000	1200	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Co-generation power available[1]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	2200	3300	4400	kW
Continued thermal treatment	Year 2	1760	2640	3520	kW
Continued thermal treatment	Year 3	1540	2310	3080	kW
Continued thermal treatment	Year 4	1320	1980	2640	kW
Cool-down	Year 5	0	0	0	kW
Cool-down	Year 6	0	0	0	kW
Cool-down	Year 7	0	0	0	kW
Grid power comsumption[2]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	1350	1780	1080	kW
Continued thermal treatment	Year 2	1791	2440	1960	kW
Continued thermal treatment	Year 3	250	350	500	kW
Continued thermal treatment	Year 4	250	350	500	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Recommended minimum service	project	2000	2500	2500	kW
1) Co-generation power rates reduced with scaled down steam injection rates					
2) A minimum of 50% of the general process power is assumed to be provided by grid power					

THE SEATTLE TIMES LOCAL / REGIONAL THURSDAY, JUNE 14, 2001

Expect a cap on electrical rates outside California

P-I STAFF AND NEWS SERVICES

WASHINGTON — Federal regulators are expected next week to expand price restrictions on electricity to include Washington state, according to government officials.

According to congressional and industry sources, the Federal Energy Regulatory Commission on Monday is likely to broaden the caps, which it announced in April. They now apply only to California, and only when low power reserves cause a supply emergency.

The restrictions impose ceilings on how much power generators can charge utilities on the wholesale market.

It is unclear what the effect would be on energy prices in Washington state, but electrical and natural-gas prices in California declined after the April order. Although FERC Chairman Curtis Hebert attributed the drop to the limited price controls, Senate Democrats say the reason for the lower prices is uncertain.

Western lawmakers said expanding the price caps to other states and to non-emergency transactions would be a step in the right direction but would still fall short of the extended price caps for which Sen. Patty Murray, D-Wash., and others have been calling.

"It's encouraging that they are going to wake up and smell the coffee and recognize they have a legal responsibility to assure prices are just and reasonable," said Murray's spokesman, Todd Webster. "Senator Murray is hopeful that FERC will come out of hibernation and address the price gouging."

Murray has been pressing FERC to set a two-year price cap that would not apply to any plants currently under construction "but would tamp down on some of these crazy prices being charged," Webster said.

This week, electrical prices on the spot market in California fell to below $100 a megawatt-hour for the first time this year. Natural-gas prices eased, too. Earlier this year, prices frequently surpassed $300 a megawatt-hour, 10 times what they were in precrisis 1999. A megawatt is enough electricity to serve about 600 homes.

"Our price mitigation plan is working," Hebert said yesterday. However, California officials say it is too early to make that claim.

At a Senate hearing yesterday, Sen. Dianne Feinstein, D-Calif., said the reason for recent price drops is unclear, but that "it now appears" FERC will broaden its April order.

The five-member commission of three Republicans and two Democrats has come under attack from Democrats in Congress and from California Gov. Gray Davis. Davis has criticized the limited price caps, calling them inadequate and full of loopholes; he has also charged FERC with being far too timid in curtailing price gouging in the wholesale Western power markets.

The commission regulates wholesale electrical markets and interstate natural-gas pipelines. Under a 1934 law, it is required to ensure prices are just and reasonable.

Hebert, a Republican named chairman by President Bush in January, defended the agency at an energy forum yesterday but also acknowledged the recent criticism: "We're not the most popular people in town right now."

Also yesterday, several economists told a Senate hearing that temporary price controls, if structured properly, should not impede electrical investments and supplies as Republican lawmakers and the administration have argued.

"It is incorrect that regulation necessarily interferes with supplies," Cornell economist Alfred Kahn, a prominent deregulation advocate, told the Senate Governmental Affairs Committee.

Kahn said that if price caps were temporary, exempted new power plants, and provided sufficient profits, "there will be no shortage of people interested and willing to build new power plants."

"The greatest danger is continued chaos," said Paul Joskow, an economist at the Massachusetts Institute of Technology. He, too, urged some price controls based on costs of production.

Sen. Fred Thompson, R-Tenn., said the economists were painting "a rosy picture." He read letters from several Wall Street analysts who insisted that price controls would be a "recipe for disaster" and make investors reluctant to enter the California power market.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

SEATTLE POST-INTELLIGENCER | THURSDAY, JUNE 14, 2001

NATION

POWER

CONTINUED FROM B 1

in April apply only to California markets in emergency situations.

Peak demand prices for electricity on the Mid-Columbia wholesale market — where Northwest utilities buy power — slid below $100 a megawatt-hour June 6 for the first time this year. At times this month they have dipped as low as $36.80.

That's a far cry from the $500 per megawatt-hour some expected for this time of year or the up to $750 per megawatt-hour paid in December.

Prices for natural gas are also tumbling, hitting $3.46 per million British thermal units for gas traded at the hub at Sumas, Whatcom County, yesterday, down from an unprecedented high of $14.20 in January.

The drop in price this spring has been precipitous, with prices falling 23.4 percent from last month to this month, according to Kelley Doolan, natural-gas market specialist for Platts, a division of McGraw-Hill.

Experts cited a range of factors for the wholesale-price drops:

• Weather is the biggest single reason, as well as the largest wild card in the West Coast energy picture. Unusually cool, wet weather has prevailed in recent weeks throughout the West, cutting the usual demand for air conditioning.

• Decline in demand as a result of conservation. Power consumption is down 6.5 percent in California for the three months ending in May compared with the similar period a year ago, adjusted for differences in the weather, according to the California Energy Commission.

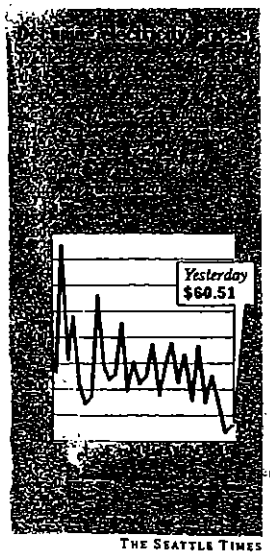
In Washington state, energy experts report a 5 percent reduction in use so far this year. "What we are doing is working," said Ralph Cavanaugh, Northwest energy-program director for the Natural Resources Defense Council an environmental group.

• Decrease in demand by industrial users. Power guzzlers, such as aluminum companies, have unplugged, reducing demand on the grid in the Pacific Northwest.

• Increase in supply. California power plants shut down for spring maintenance in April and May are now back on line for the summer. That put about 15,000 megawatts of generating capacity back on the grid. New power plants have also fired up, including one in Oregon and another in Idaho.

Spring runoff has also added water to Northwest rivers, boosting supply for hydroelectric generation.

Relatively speaking, though, wholesale prices for electricity and natural gas are high: gas costs about twice what it did a year and a half ago, and so does electricity. "We are out of the stratosphere, but we haven't landed," said Jim Lazar, an independent energy consultant based in Olympia.



THE SEATTLE TIMES

And consumers have yet to see any cut in retail rates.

Gas prices statewide went up by 50 percent this year over last for the average residential customer in response to the jump in wholesale prices.

Electric utilities around the region also raised rates and are forecasting rate increases, not decreases.

While wholesale electricity prices could indeed spike when the water runs low and the temperatures rise, some experts see longer-term relief in natural-gas prices.

Cool weather — which has reduced the demand for power, including gas-fired power generation — has allowed suppliers to put natural gas into storage at record rates.

That means storage could be adequate for the coming winter, Doolan said. New supplies should also be available in time for the coming heating season because of increased drilling.

Electrical supplies from hydropower will also increase if normal rains return to the Northwest this fall. That in turn would decrease reliance on more expensive gas-generated power, dampening the demand and price for natural gas.

Lynda V. Mapes can be reached at 206-464-2736 or lmapes@seattletimes.com.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

John Spear
10/26/01 11:17 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Backup for energy pricing

Harry,

The attached excel file is a summary of our sources for the energy prices from EIA's report. I tried to pull the sections out of the report we want to put in the estimate as backups but they are pdf, gif or some other kinds of files that I can't get into. You will have to go the website or have someone else go there, and find the tables and sections I reference on the spreadsheet. Otherwise I could copy them here and fed ex them to you. I will fax them to you now so you know what they look like.

The website address is: www.eia.doe.gov/oiaf/aeo

I think that will get you there. The tables are mostly in the appendices which have a link in very small print to the left of the text. Table 26 is the only table listed that is in the text itself on page 107.

Jack

Sources for Elec & Gas Prices.:

McCORMICK & BAXTER

10/25/01

SOURCES FOR ASSUMPTIONS FOR NATURAL GAS AND ELECTRICITY PRICING USED IN THE CD ESTIMATES

Annual Energy Outlook 2001 With Projections to 2020
Report #DOE/EIA-0383(2001)
Published by:

Energy Information Administration (EIA)
Office of Integrated Analysis and Forecasting
U.S. Department of Energy

Publication available on the WEB at:
www.eia.doe.gov/oiaf/aeo/

Attached sections and tables of the report:

1. Overview
2. Table 26. Comparison of natural gas forecasts..
3. Table A3. Energy Prices by Sector and Source
4. Table A8. Electricity Supply, Disposition, Prices and Emissions
5. Table A14. Natural Gas Prices, Margins & Revenues (Ref. Case Forecast)
6. Table B14. Natural Gas Prices, Margins & Revenue (Economic Growth Case Comparisons)

From this report the assumptions have been made for the conceptual design estimate as follows:

Natural gas will be available to the site at the price of:	$3.50	per Million Btu
Electricity will be available to the site at the price of :	$0.06	per KW hour

COST IMPACTS OF INCREASED UTILITY RATES

	RATE	UNIT	SCENARIO 1	SCENARIO 2	SCENARIO 3	P&T
GAS						
	$7.00	MMBTU	$20,552,203	$30,813,298	$41,081,657	$0
	$10.00	MMBTU	$38,168,055	$57,224,717	$76,294,566	$0
ELECTRICITY						
	$0.10	KWH	$1,754,725	$2,368,444	$4,181,897	$7,939,200
	$0.30	KWH	$10,491,743	$14,210,649	$19,129,337	$47,638,500

NOTE:

1. Total cost increases are for the life cycle of the project with no present value discount. (7 years for all thermal scenarios and 100 years for the P&T option.)
2. Electricity cost increases for the thermal options assume that co-generation covers cost of electrode power requirements (but not GWTP power) for years 1 & 2 of the heatup and the power requirements of the GWTP for years 3 & 4.
   For years 5 thru 7 of the thermal options the power is from the grid.
3. All power for the P&T option is electrical from the grid (no gas).

John Spear
06/29/01 09:32 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: heron@steamtech.com
Subject: Natural Gas prices for CD estimate - McCormick & Baxter

Harry,

I looked up some reports and projections done by the Energy Information Administration which is within the Dept of Energy. Their report attached which is entitled "US Natural Gas Markets: Recent Trends and Prospects for the Future" talks about the recent spike in gas prices and why they happened. They project (on page 5 of 7 of the Executive Summary) prices to moderate by 2002 to 4.43 per MMBTU. This article is informative but may still be a bit pessimistic. Another publication of the EIA is Table 14 (attached) which projects prices delivered to Industrial Users out to the year 2016. It seems to project pricing in the range of an average of $3.22 to $3.40 per 1000 CFT or about $3.00 to $3.13 per MMBTU over the next 10 years (in 1999 dollars). These are average projections for the whole USA . Another table I got from their website showed average 1999 pricing to Industrial users in California was $3.26 per Thousand CFT while the average for the USA was 3.11. This indicates that the price to California users is somewhat higher than the national average even before the 2000 to 2001 price anomalies kicked in.

In summary I think the rate we are using at $2.50 is unsustainable. Probably could go with the long term projections of Table 14 which would put our price around $3.30 plus about 5% inflation to 2001 or a number at $3.47 or so. (All prices on the Table are 1999 dollars.)

The article, "US Natural Gas Markets.....", is a good justification for not using any of the prices experienced in the last year or so because it explains the breakdown of the El Paso gas line coming into New Mexico and restricting capacity to California and also the reluctance of gas suppliers to sell to PG&E and the other Electricity Co. that was going broke. (The long term projections of Table 14 may even be high because their demand projections include a 3.6% growth or something like that for GDP. I believe the growth of the last year has actually been less than 2%.)

Take a look at the reports and let's adjust the gas costs to something that is probably more in line with government projections. We'd have somewhere to hang our hats at least.

Annual Energy Outlook 2001 - Forecast Comparisons TE) hruler01.gif eialogo3.gif

These files are something of a mystery to me. I saved the files from the doe website but the Table 4 is in the "Annual Energy Outlook 2001..." and the US Natural Gas Markets....." report is the other two files. If you have a problem with them I will fax or give you the website.

Jack

eia.doe.gov

Energy Information Administration

Official Energy Statistics from the U.S. Government

Search

by Google: GO

- Energy A-Z
- What's New
- About Us / Jobs
- Press Releases
- Kid's Page
- Publications
- Historical Data
- Sign Up for Email Updates
- Contact Experts
- Energy Links
- Presentations
- Energy Events
- Privacy/Security

How do you want to access energy information?

Click for a text menu

Or would you like to access specific subject areas?

Need Help?

phone: 202-586-8800
email: infoctr@eia.doe.gov
Specialized Information Services
For Technical Problems
phone: 202-586-8959
email: wmaster@eia.doe.gov

Energy Information Administration, EI 30
1000 Independence Avenue, SW
Washington, DC 20585

Home | Petroleum | Gasoline | Diesel | Natural Gas | Electricity | Coal | Nuclear | Renewables
Alternative Fuels | Prices | States | International | Country Analysis Briefs
Environment | Analyses | Forecasts | Processes | Sectors

Page last modified on 06/13/2001 12:25:21

Fea
Status
Califor
Situati
Gasoli
Fuel U
U.S. Na
Market
Trends
Prospe
Future
Short-
Weekl
Status
Natura
Update
Electri
Restru
Energy
Rankin
Pu
Recent
Statist
Annual
Proje

DOE/EIA-0383(2001)

Annual Energy Outlook 2001

With Projections to 2020

December 2000

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

This publication is on the WEB at:
www.eia.doe.gov/oiaf/aeo/

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the U.S. Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

For Further Information . . .

The *Annual Energy Outlook 2001* (*AEO2001*) was prepared by the Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, under the direction of Mary J. Hutzler (mhutzler@eia.doe.gov, 202/586-2222), Director, Office of Integrated Analysis and Forecasting; Susan H. Holte (sholte@eia.doe.gov, 202/586-4838), Director, Demand and Integration Division; James M. Kendell (jkendell@eia.doe.gov, 202/586-9646), Director, Oil and Gas Division; Scott Sitzer (ssitzer@eia.doe.gov, 202/586-2308), Director, Coal and Electric Power Division; and Andy S. Kydes (akydes@eia.doe.gov, 202/586-2222), Senior Modeling Analyst.

For ordering information and questions on other energy statistics available from EIA, please contact EIA's National Energy Information Center. Addresses, telephone numbers, and hours are as follows:

National Energy Information Center, EI-30
Energy Information Administration
Forrestal Building
Washington, DC 20585

Telephone: 202/586-8800
FAX: 202/586-0727
TTY: 202/586-1181
9 a.m. to 5 p.m., eastern time, M-F

E-mail: infoctr@eia.doe.gov
World Wide Web Site: http://www.eia.doe.gov/
FTP Site: ftp://ftp.eia.doe.gov/

Specific questions about the information in this report may be directed to:

Overview,	
Carbon Dioxide Emissions	Susan H. Holte (sholte@eia.doe.gov, 202/586-4838)
Economic Activity	Ronald Earley (rearley@eia.doe.gov, 202/586-1398)
International Oil Markets	G. Daniel Butler (gbutler@eia.doe.gov, 202/586-9503)
Residential Demand	John Cymbalsky (jcymbals@eia.doe.gov, 202/586-4815)
Commercial Demand	Erin Boedecker (eboedeck@eia.doe.gov, 202/586-4791)
Industrial Demand	T. Crawford Honeycutt (choneycu@eia.doe.gov, 202/586-1420)
Transportation Demand	David Chien (dchien@eia.doe.gov, 202/586-3994)
Electricity Generation, Capacity	J. Alan Beamon (jbeamon@eia.doe.gov, 202/586-2025)
Electricity Prices	Lori Aniti (laniti@eia.doe.gov, 202/586-2867)
Nuclear Energy	Laura Martin (lmartin@eia.doe.gov, 202/586-1494)
Renewable Energy	Thomas Petersik (tpetersi@eia.doe.gov, 202/586-6582)
Oil and Gas Production	Ted McCallister (tmccalli@eia.doe.gov, 202/586-4820)
Natural Gas Markets	Phyllis Martin (pmartin@eia.doe.gov, 202/586-9592)
Oil Refining and Markets	Stacy MacIntyre (smacinty@eia.doe.gov, 202/586-9795)
Coal Supply and Prices	Michael Mellish (mmellish@eia.doe.gov, 202/586-2136)

AEO2001 will be available on the EIA web site at www.eia.doe.gov/oiaf/aeo/ by December 22, 2000. Assumptions underlying the projections and tables of regional and other detailed results will also be available on December 22, 2000, at web sites www.eia.doe.gov/oiaf/assumption/ and /supplement/. Model documentation reports for the National Energy Modeling System (NEMS) and the report *NEMS: An Overview* are available at web site www.eia.doe.gov/bookshelf/docs.html.

Other contributors to the report include Bruce Bawks, Joseph Benneche, Robert Eynon, Edward Flynn, Mark Friedman, Zia Haq, James Hewlett, Jeff Jones, Diane Kearney, Paul Kondis, Thomas Leckey, Han-Lin Lee, James Lockhart, Chetha Phang, Eugene Reiser, Laurence Sanders, David Schoeberlein, Dan Skelly, Kay Smith, Brian Unruh, Dana Van Wagener, Steven Wade, Peggy Wells, and Thomas White.

Preface

The *Annual Energy Outlook 2001* (*AEO2001*) presents midterm forecasts of energy supply, demand, and prices through 2020 prepared by the Energy Information Administration (EIA). The projections are based on results from EIA's National Energy Modeling System (NEMS).

The report begins with an "Overview" summarizing the *AEO2001* reference case. The next section, "Legislation and Regulations," discusses evolving legislative and regulatory issues. "Issues in Focus" discusses the macroeconomic projections, world oil and natural gas markets, oxygenates in gasoline, distributed electricity generation, electricity industry restructuring, and carbon dioxide emissions. It is followed by the analysis of energy market trends.

The analysis in *AEO2001* focuses primarily on a reference case and four other cases that assume higher and lower economic growth and higher and lower world oil prices than in the reference case. Forecast tables for those cases are provided in Appendixes A through C. Alternative cases explore the impacts of varying key assumptions in NEMS—e.g., technology penetration. The major results for the alternative cases are shown in Appendix F. Appendix G briefly describes NEMS, the *AEO2001* assumptions, and the alternative cases.

The *AEO2001* projections are based on Federal, State, and local laws and regulations in effect on July 1, 2000. Pending legislation and sections of existing legislation for which funds have not been appropriated are not reflected in the forecasts. Historical data used for the *AEO2001* projections were the most current available as of July 31, 2000, when most 1999 data but only partial 2000 data were available. Historical data are presented in this report for comparative purposes; documents referenced in the source notes should be consulted for official data values. The projections for 2000 and 2001 incorporate the short-term projections from EIA's September 2000 *Short-Term Energy Outlook*.

The *AEO2001* projections are used by Federal, State, and local governments, trade associations, and other planners and decisionmakers in the public and private sectors. They are published in accordance with Section 205c of the Department of Energy Organization Act of 1977 (Public Law 95 91), which requires the EIA Administrator to prepare annual reports on trends and projections for energy use and supply.

The projections in *AEO2001* are not statements of what will happen but of what might happen, given the assumptions and methodologies used. The projections are business-as-usual trend forecasts, given known technology, technological and demographic trends, and current laws and regulations. Thus, they provide a policy-neutral reference case that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes. All laws are assumed to remain as currently enacted; however, the impacts of emerging regulatory changes, when defined, are reflected.

Because energy markets are complex, models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior. Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Behavioral characteristics are indicative of real-world tendencies rather than representations of specific outcomes.

Energy market projections are subject to much uncertainty. Many of the events that shape energy markets are random and cannot be anticipated, including severe weather, political disruptions, strikes, and technological breakthroughs. In addition, future developments in technologies, demographics, and resources cannot be foreseen with any degree of certainty. Many key uncertainties in the *AEO2001* projections are addressed through alternative cases.

EIA has endeavored to make these projections as objective, reliable, and useful as possible; however, they should serve as an adjunct to, not a substitute for, analytical processes in the examination of policy initiatives.

The Office of Integrated Analysis and Forecasting dedicates this report in memory of Richard Newcombe (1941-2000). Richard worked on the coal forecasts in past AEOs; his expertise and understanding of the coal industry, as well as his attention to detail, are greatly missed.

Contents

	Page
Overview	1
Legislation and Regulations	9
Introduction	10
Nitrogen Oxide Emission Caps	11
FERC Order 2000	11
Updates on State Renewable Portfolio Standards and Renewable Energy Mandates	12
FERC Order 637	12
Royalty Rules	13
Tier 2 Vehicle Emissions and Gasoline Sulfur Standards	14
Heavy-Duty Vehicle Emissions and Diesel Fuel Quality Standards	15
Banning or Reducing the Use of MTBE in Gasoline	15
Proposed Changes to RFG Oxygen Standard	16
Proposed Limits on Benzene in Gasoline	16
Low-Emission Vehicle Program	17
Appliance Efficiency Standards	18
Petroleum Reserves	19
Issues in Focus	21
Macroeconomic Forecasting with the Revised National Income and Product Accounts (NIPA)	22
World Oil Demand and Prices	27
Natural Gas Supply Availability	28
Phasing Out MTBE in Gasoline	35
Distributed Electricity Generation Resources	37
Restructuring of State Retail Markets for Electricity	41
Carbon Dioxide Emissions in *AEO2001*	45
Market Trends	55
Trends in Economic Activity	56
Economic Growth Cases	57
International Oil Markets	58
Energy Demand	61
Residential Sector Energy Demand	63
Commercial Sector Energy Demand	64
Industrial Sector Energy Demand	65
Transportation Sector Energy Demand	67
Energy Demand in Alternative Technology Cases	69
Electricity	72
Electricity Sales	72
Electricity Generating Capacity	73
Electricity Prices	74
Electricity Generation	75
Nuclear Power	76
Electricity Alternative Cases	77
Electricity from Renewable Sources	79
Oil and Natural Gas	81
Oil and Gas Prices	81
Oil and Gas Reserve Additions	82
Natural Gas Production and Imports	83
Natural Gas Consumption	84
Natural Gas Prices	85
Oil and Gas Alternative Cases	86
Oil Production and Consumption	88
Petroleum Imports and Refining	89
Refined Petroleum Products	90

Contents

Market Trends (continued) Page

Coal 92
Coal Production and Prices 92
Coal Mining Labor Productivity 93
Coal Transportation Costs 94
Coal Consumption 95
Coal Exports 96
Emissions 97
Carbon Dioxide and Methane Emissions 97
Emissions from Electricity Generation 99

Forecast Comparisons **101**

List of Acronyms **112**

Notes and Sources **113**

Appendixes

A. Reference Case Forecast 127
B. Economic Growth Case Comparisons 155
C. Oil Price Case Comparisons 183
D. Crude Oil Equivalency Summary 211
E. Household Expenditures 213
F. Results from Side Cases 216
G. Major Assumptions for the Forecasts 230
H. Conversion Factors 251

Index **253**

Tables

1. Summary of results for five cases 7
2. Summer season NO_x emissions budgets for 2003 and beyond 11
3. Effective dates of appliance efficiency standards, 1988-2005 18
4. Historical revisions to growth rates of GDP and its major components, 1959-1998 22
5. Revisions to nominal GDP, 1959-1998 23
6. Revisions to nominal GDP for 1998 23
7. Historical growth in GDP, the labor force, productivity and energy intensity 23
8. Forecast comparison of key macroeconomic variables 25
9. Cost and performance of generic distributed generators 38
10. Projected installed costs and electrical conversion efficiencies for distributed generation technologies by year of introduction and technology, 2000-2020 39
11. Costs of industrial cogeneration systems, 1999 and 2020 40
12. New car and light truck horsepower ratings and market shares, 1990-2020 67
13. Costs of producing electricity from new plants, 2005 and 2020 75
14. Technically recoverable U.S. oil and gas resources as of January 1, 1999 81
15. Natural gas and crude oil drilling in three cases, 1999-2020 82
16. Transmission and distribution revenues and margins, 1970-2020 85
17. Components of residential and commercial natural gas end-use prices, 1985-2020 85
18. Petroleum consumption and net imports in five cases, 1999 and 2020 89
19. Forecasts of economic growth, 1999-2020 102
20. Forecasts of world oil prices, 2000-2020 102
21. Forecasts of average annual growth rates for energy consumption 103
22. Forecasts of average annual growth in residential and commercial energy demand 103
23. Forecasts of average annual growth in industrial energy demand 103
24. Forecasts of average annual growth in transportation energy demand 104
25. Comparison of electricity forecasts 105
26. Comparison of natural gas forecasts 107
27. Comparison of petroleum forecasts 109
28. Comparison of coal forecasts 111

Figures

Page

1. Fuel price projections, 1999-2020: *AEO2000* and *AEO2001* compared 2
2. Energy consumption by fuel, 1970-2020 4
3. Energy use per capita and per dollar of gross domestic product, 1970-2020 5
4. Electricity generation by fuel, 1970-2020 5
5. Energy production by fuel, 1970-2020 6
6. Net energy imports by fuel, 1970-2020 6
7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 6
8. Index of energy use per dollar of gross domestic product, 1960-1998 24
9. Annual growth in real gross domestic product: 21-year moving average, 1980-2020 24
10. Projected average annual growth in sectoral output, 1999-2020 25
11. Projected commercial delivered energy intensity by fuel, 1999-2020 26
12. Projected industrial energy intensity by fuel, 1999-2020 26
13. Projected new light-duty vehicle and on-road stock fuel efficiency, 1999-2020 27
14. Refiner acquisition cost of imported crude oil, 1997-2000 27
15. World oil supply and demand forecast in the AEO2001 reference case, 1995-2020 28
16. Net U.S. imports of natural gas, 1970-2020 30
17. Lower 48 natural gas wells drilled, 1970-2020 31
18. Technically recoverable U.S. natural gas resources as of January 1, 1999 32
19. Lower 48 end-of-year natural gas reserves, 1990-2020 32
20. Lower 48 natural gas production in three resource cases, 2000-2020 33
21. Average lower 48 natural gas wellhead prices in three resource cases, 2000-2020 33
22. Lower 48 natural gas production in three technology cases, 1970-2020 34
23. Major new U.S. natural gas pipeline systems, 1990-2000 35
24. Projected buildings sector electricity generation by selected distributed resources in the reference case, 2000-2020 40
25. Cogeneration capacity by type and fuel, 1999 and 2020 41
26. Average annual electricity prices for competitive and noncompetitive regions, 1995-2020 43
27. Projected average regional electricity prices, 2000 and 2020 44
28. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 45
29. U.S. carbon dioxide emissions per capita, 1990-2020 45
30. U.S. carbon dioxide emissions per unit of gross domestic product, 1990-2020 46
31. Projected U.S. energy consumption in three economic growth cases, 1990-2020 48
32. Projected U.S. carbon dioxide emissions in three economic growth cases, 1990-2020 49
33. Projected U.S. energy intensity in three economic growth cases, 1990-2020 49
34. Projected U.S. energy intensity in three technology cases, 1990-2020 50
35. Projected U.S. energy consumption in three technology cases, 1990-2020 50
36. Projected U.S. carbon dioxide emissions in three technology cases, 1990-2020 51
37. Projected average annual real growth rates of economic factors, 1999-2020 56
38. Projected sectoral composition of GDP growth, 1999-2020 56
39. Projected average annual real growth rates of economic factors in three cases, 1999-2020 57
40. Annual GDP growth rate for the preceding 21 years, 1970-2020 57
41. World oil prices in three cases, 1970-2020 58
42. OPEC oil production in three cases, 1970-2020 58
43. Non-OPEC oil production in three cases, 1970-2020 59
44. Persian Gulf share of worldwide oil exports in three cases, 1965-2020 59
45. Projected U.S. gross petroleum imports by source, 1999-2020 60
46. Projected worldwide refining capacity by region, 1999 and 2020 60
47. Primary and delivered energy consumption, excluding transportation use, 1970-2020 61
48. Energy use per capita and per dollar of gross domestic product, 1970-2020 61
49. Delivered energy use by fossil fuel and primary energy use for electricity generation, 1970-2020 62
50. Primary energy consumption by sector, 1970-2020 62
51. Residential primary energy consumption by fuel, 1970-2020 63
52. Residential primary energy consumption by end use, 1990, 1997, 2010, and 2020 63

Contents

Figures (continued) **Page**

53. Efficiency indicators for selected residential appliances, 1999 and 2020 64
54. Commercial nonrenewable primary energy consumption by fuel, 1970-2020 64
55. Commercial primary energy consumption by end use, 1999 and 2020 65
56. Industrial primary energy consumption by fuel, 1970-2020 65
57. Industrial primary energy consumption by industry category, 1994-2020 66
58. Industrial delivered energy intensity by component, 1994-2020 66
59. Transportation energy consumption by fuel, 1975, 1999, and 2020 67
60. Projected transportation stock fuel efficiency by mode, 1999-2020 67
61. Projected technology penetration by mode of travel, 2020 68
62. Projected sales of advanced technology light-duty vehicles by fuel type, 2010 and 2020 68
63. Projected variation from reference case primary energy use by sector in two alternative cases, 2010, 2015, and 2020 69
64. Projected variation from reference case primary residential energy use in three alternative cases, 2000-2020 69
65. Projected cost and investment for selected residential appliances in the best available technology case, 2000-2020 70
66. Present value of investment and savings for residential appliances in the best available technology case, 2000-2020 70
67. Projected variation from reference case primary commercial energy use in three alternative cases, 2000-2020 70
68. Projected industrial primary energy intensity in two alternative cases, 1994-2020 71
69. Projected changes in key components of the transportation sector in two alternative cases, 2020 71
70. Population, gross domestic product, and electricity sales, 1965-2020 72
71. Annual electricity sales by sector, 1970-2020 72
72. Projected new generating capacity and retirements, 2000-2020 73
73. Projected electricity generation capacity additions by fuel type, including cogeneration, 2000-2020 73
74. Fuel prices to electricity generators, 1990-2020 74
75. Average U.S. retail electricity prices, 1970-2020 74
76. Projected electricity generation costs, 2005 and 2020 75
77. Projected electricity generation by fuel, 1999 and 2020 75
78. Nuclear power plant capacity factors, 1973-2020 76
79. Projected operable nuclear capacity in three cases, 1995-2020 76
80. Projected electricity generation costs by fuel type in two advanced nuclear cost cases, 2005 and 2020 77
81. Projected cumulative new generating capacity by type in two cases, 1999-2020 77
82. Projected cumulative new generating capacity by technology type in three economic growth cases, 1999-2020 78
83. Projected cumulative new generating capacity by technology type in three fossil fuel technology cases, 1999-2020 78
84. Grid-connected electricity generation from renewable energy sources, 1970-2020 79
85. Projected nonhydroelectric renewable electricity generation by energy source, 2010 and 2020 79
86. Projected nonhydroelectric renewable electricity generation by energy source in two cases, 2020 80
87. Wind-powered electricity generating capacity in two cases, 1985-2020 80
88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 81
89. U.S. petroleum consumption in five cases, 1970-2020 81
90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 81
91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 82
92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 82
93. Lower 48 crude oil reserve additions in three cases, 1970-2020 82
94. Natural gas production by source, 1990-2020 83
95. Natural gas production, consumption, and imports, 1970-2020 83
96. Natural gas consumption by sector, 1990-2020 84

Figures (continued)

Page

97. Projected pipeline capacity expansion by Census division, 1999-2020 ... 84
98. Projected pipeline capacity utilization by Census division, 1999 and 2020 ... 84
99. Natural gas end-use prices by sector, 1970-2020 ... 85
100. Wellhead share of natural gas end-use prices by sector, 1970-2020 ... 85
101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 ... 86
102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 ... 86
103. Lower 48 crude oil production in three technology cases, 1970-2020 ... 87
104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 ... 87
105. Crude oil production by source, 1970-2020 ... 88
106. Petroleum supply, consumption, and imports, 1970-2020 ... 88
107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 ... 89
108. Domestic refining capacity in three cases, 1975-2020 ... 89
109. Petroleum consumption by sector, 1970-2020 ... 90
110. Consumption of petroleum products, 1970-2020 ... 90
111. U.S. ethanol consumption, 1993-2020 ... 91
112. Components of refined product costs, 1999 and 2020 ... 91
113. Coal production by region, 1970-2020 ... 92
114. Average minemouth price of coal by region, 1990-2020 ... 92
115. Coal mining labor productivity by region, 1990-2020 ... 92
116. Labor cost component of minemouth coal prices, 1970-2020 ... 93
117. Average minemouth coal prices in three mining cost cases, 1990-2020 ... 93
118. Projected change in coal transportation costs in three cases, 1999-2020 ... 94
119. Projected variation from reference case projections of coal demand in two economic growth cases, 2020 ... 94
120. Electricity and other coal consumption, 1970-2020 ... 95
121. Projected coal consumption in the industrial and buildings sectors, 2010 and 2020 ... 95
122. Projected U.S. coal exports by destination, 2010 and 2020 ... 96
123. Projected coal production by sulfur content, 2010 and 2020 ... 96
124. Projected carbon dioxide emissions by sector, 2000, 2010, and 2020 ... 97
125. Projected carbon dioxide emissions by fuel, 2000, 2010, and 2020 ... 97
126. Projected carbon dioxide emissions from electricity generation by fuel, 2000, 2010, and 2020 ... 98
127. Projected methane emissions from energy use, 2005-2020 ... 98
128. Projected sulfur dioxide emissions from electricity generation, 2000-2020 ... 99
129. Projected nitrogen oxide emissions from electricity generation, 2000-2020 ... 99

Overview

Key Energy Issues to 2020

Currently, most attention in energy markets is focused on near-term issues of world oil supply and prices, U.S. natural gas prices, and the transition to restructured electricity markets in several regions of the country. The *Annual Energy Outlook 2001* (*AEO2001*) addresses the longer-term trends of electricity industry restructuring, fossil fuel supply and prices, and the impacts of economic growth on projected energy use and carbon dioxide emissions. *AEO2001* does not project short-term events, such as supply disruptions or severe weather.

The *AEO2001* projections assume a transition to full competitive pricing of electricity in States with specific deregulation plans—California, New York, New England, the Mid-Atlantic States, Illinois, Texas, Oklahoma, Michigan, Ohio, Arizona, New Mexico, and West Virginia. Other States are assumed to continue cost-of-service electricity pricing. A transition from regulated to competitive prices over a 10-year period from the beginning of restructuring in each region, and implementation of the provisions of California legislation regarding price caps, are assumed. Increased competition in electricity markets is also represented through assumed changes in the financial structure of the industry and efficiency and operating improvements.

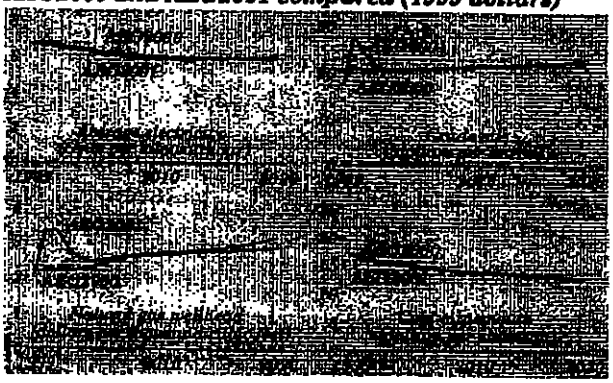
World oil prices fell sharply through most of 1997 and 1998, due in part to economic developments in East Asia and the resulting oversupply of oil. Beginning in 1999, actions by the Organization of Petroleum Exporting Countries (OPEC) and some non-OPEC countries to restrain oil production have increased world oil prices. U.S. natural gas prices have also increased in 2000 due to higher than expected demand and to tight supplies caused by reduced drilling in reaction to low prices in 1998. Oil and gas markets are addressed on pages 27 and 28.

The projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in *AEO2001* than in *AEO2000*, an average annual rate of 3.0 percent from 1999 to 2020, compared with 2.1 percent in *AEO2000*. Although part of the upward revision results from statistical and definitional changes in the National Income and Product Accounts, the projections also reflect a more optimistic view of long-run economic growth, which results in higher forecasts of energy consumption and carbon dioxide emissions in *AEO2001* than in *AEO2000*. The macroeconomic projections are discussed on pages 22 and 56.

Prices

The average world oil price is projected to increase from $17.35 per barrel in 1999 (1999 dollars) to about $27.60 per barrel in 2000, falling to about $20.50 per barrel by 2003. In 2020, the projected price reaches $22.41 per barrel (Figure 1), similar to the *AEO2000* projection of $22.33 per barrel. Higher demand in the forecast is offset by higher resource estimates from the U.S. Geological Survey. Projected prices over the next several years are higher in *AEO2001* than in *AEO2000* due to the production cutbacks by OPEC and several non-OPEC nations, a lag in the response of non-OPEC producers to price increases, and renewed demand growth in Asia.

Figure 1. Fuel price projections, 1999-2020: AEO2000 and AEO2001 compared (1999 dollars)



World oil demand is projected to increase from 75.5 million barrels per day in 1999 to 117.4 million barrels per day in 2020—higher than the *AEO2000* projection of 112.4 million barrels per day—due to higher projected demand in the United States, the Middle East, the former Soviet Union, the Pacific Rim developing countries, and China. Projected growth in production in both OPEC and non-OPEC nations leads to relatively slow projected growth of prices through 2020. OPEC oil production is expected to reach 57.6 million barrels per day in 2020, nearly double the 29.9 million barrels per day in 1999, assuming sufficient capital to expand production capacity. The United Nations resolution limiting Iraqi oil exports is assumed to remain in place through 2001. Once sanctions are lifted, Iraqi oil production is expected to reach 3.5 million barrels per day within 2 years and about 5 million barrels per day within a decade.

The June 2000 recoverable oil resources assessment by the U.S. Geological Survey raised world resources by about 700 billion barrels from the 1994 assessment. As a result, non-OPEC oil production is expected to increase from 44.8 million barrels per day to 59.5 million barrels per day between 1999 and 2020, or 2.9 million barrels per day higher than in *AEO2000*. Production from the Caspian Basin is expected to reach 6 million barrels per day by 2020 with continued expansion of production from the offshore regions of West Africa and the North Sea. Both Brazil and Colombia are expected to be producing 1 million barrels per day before 2005, and production in Mexico and Canada is also expected to increase.

The average wellhead price of natural gas is projected to increase from $2.08 per thousand cubic feet in 1999 to about $3.30 per thousand cubic feet in 2000 and 2001, then decline through 2004. The projected price reaches $3.13 per thousand cubic feet in 2020, $0.28 per thousand cubic feet higher than in *AEO2000*, due to higher projected demand. Price increases are expected to be slowed by technological improvements in natural gas exploration and production. Average delivered prices are projected to increase at a slower rate than the wellhead price due to assumed cost reductions from efficiency improvements in the industry.

In *AEO2001*, the average minemouth price of coal is projected to decline from $16.98 per ton in 1999 to $12.70 per ton in 2020, the same price projected in *AEO2000*. Through 2020, the price is expected to decline due to increasing productivity in mining, a shift to lower-cost western production, and competitive pressures on labor costs.

Average electricity prices are projected generally to decline from 6.7 cents per kilowatthour in 1999 to 6.0 cents in 2020, increasing slightly at the end of the forecast due to rising natural gas prices. In 2020, the projected price is slightly higher than the 5.9 cents per kilowatthour projected in *AEO2000*. Higher projections for natural gas prices and for electricity demand—which would require more investment in new generating capacity—lead to the higher price projections. Electricity industry restructuring is expected to contribute to lower prices through reductions in operating and maintenance, administrative, and other costs. Federal Energy Regulatory Commission actions on open access and other changes for competitive markets enacted by some State public utility commissions are included in the projections, as noted above. Because not all States have deregulated their electricity markets, the projections do not represent a fully restructured electricity market. State legislative actions to deregulate the electricity industry are discussed on page 41.

Consumption

Total energy consumption is projected to increase from 96.1 quadrillion British thermal units (Btu) to 127.0 quadrillion Btu between 1999 and 2020, an average annual increase of 1.3 percent. In 2020, this forecast is about 6 quadrillion Btu higher than projected in *AEO2000*, primarily because higher projected economic growth leads to higher demand forecasts in all end-use sectors.

Total residential energy consumption is projected to grow at an average rate of 1.2 percent per year, with the most rapid growth expected for computers, electronic equipment, and appliances. In 2020, the projected residential demand is 24.4 quadrillion Btu, 1.4 quadrillion Btu higher than in *AEO2000*. Higher projected economic growth results in higher forecasts for both disposable personal income and housing starts, increasing equipment purchases and raising the projected housing stock in 2020 by 1.5 percent. *AEO2001* also forecasts that new houses will become larger over time.

Commercial energy demand is projected to grow at an average annual rate of 1.4 percent, reaching 20.8 quadrillion Btu in 2020, 2.6 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth in *AEO2001*, commercial floorspace is projected to grow more rapidly and, in 2020, is estimated to be 11 percent higher than projected in *AEO2000*. The most rapid increases in energy use are expected for computers, office equipment, and telecommunications and other equipment.

Industrial energy demand is projected to increase at an average rate of 1.0 percent per year, reaching 43.4 quadrillion Btu in 2020, 1.2 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth, total industrial gross output is estimated to grow at an average annual rate of 2.6 percent from 1999 to 2020, compared with 1.9 percent in *AEO2000*; however, recent data indicate more rapid improvements in industrial energy intensity than previously estimated. Also, average annual growth in non-energy-intensive manufacturing is expected to be 3.3 percent, compared with 1.2 percent for energy-intensive manufacturing. Through 2020,

more rapid assumed declines in industrial energy intensity, compared with *AEO2000*, are projected to offset some of the increase in demand that might be expected with higher industrial output. Cogeneration capacity is projected to increase by 19 gigawatts by 2020, 10 gigawatts more than in *AEO2000*.

Energy demand for transportation is projected to grow at an average annual rate of 1.8 percent, to 38.5 quadrillion Btu in 2020, 1.0 quadrillion Btu higher than in *AEO2000*. In *AEO2001*, the projections for light-duty vehicle and freight travel are higher than in *AEO2000* as a result of higher projected growth in personal income and industrial output. Higher light-duty vehicle travel in the forecast is partially offset by higher vehicle efficiency. New vehicle efficiency in 2020 is projected to be higher by 0.9 and 1.9 miles per gallon for new cars and light trucks, respectively, than in *AEO2000*, due to a reevaluation of the competitive potential of advanced technology vehicles.

The projections incorporate efficiency standards for new energy-using equipment in buildings and for motors mandated through 1994 by the National Appliance Energy Conservation Act of 1987 and the Energy Policy Act of 1992, including the refrigerator and fluorescent lamp ballast standards that become effective in July 2001 and April 2005, respectively. These are the only standards that are finalized with effective dates and specific efficiency levels.

Electricity demand is projected to grow by 1.8 percent per year from 1999 through 2020, higher than the rate of 1.3 percent forecast for the same period in *AEO2000*. The higher demand projection results from higher projected economic growth and a reevaluation of the potential for growth in electricity use for a variety of residential and commercial appliances and equipment, including personal computers.

The overall demand for natural gas in the U.S. energy economy is projected to grow by 2.3 percent per year on average (Figure 2), from 21.4 trillion cubic feet in 1999 to 34.7 trillion cubic feet in 2020, primarily as a result of rapid projected growth in demand for electricity generation (excluding cogenerators), which is expected to triple between 1999 and 2020. The *AEO2001* forecast for total natural gas demand in 2020 is 3.2 trillion cubic feet higher than in *AEO2000*, mainly as a result of higher projected demand for natural gas in the electricity generation sector.

In *AEO2001*, total coal consumption is projected to increase from 1,035 million tons in 1999 to 1,297 million tons in 2020, an average increase of 1.1 percent per year. The 2020 projection is 18 million tons higher than in *AEO2000*, due to higher projected demand for industrial uses and for electricity generation, which constitutes about 90 percent of the demand for coal.

Petroleum demand is projected to grow from 19.5 million barrels per day in 1999 to 25.8 million in 2020—an average rate of 1.3 percent per year—led by growth in the transportation sector, which accounts for about 70 percent of U.S. petroleum consumption. Projected demand in 2020 is higher than in *AEO2000* by 730 thousand barrels per day primarily due to a higher projection for transportation fuel use.

Renewable fuel consumption, including ethanol for gasoline blending, is projected to grow at an average rate of 1.1 percent per year through 2020, primarily as a result of State mandates. In 2020, about 55 percent of renewables are used for electricity generation and the rest for dispersed heating and cooling, industrial uses (including cogeneration), and fuel blending. The *AEO2001* forecast for renewable energy demand in 2020 is 0.4 quadrillion Btu higher than in *AEO2000*, mainly due to higher projected use of biomass in the industrial sector.

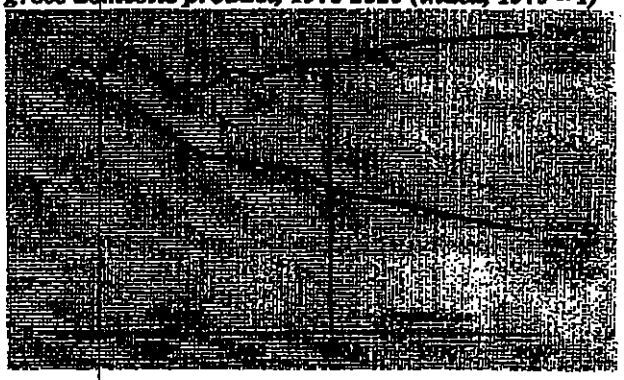
Figure 2. Energy consumption by fuel, 1970-2020 (quadrillion Btu)

Energy Intensity

Between 1970 and 1986, energy intensity, measured as energy use per dollar of GDP, declined at an average annual rate of 2.3 percent as the economy shifted to less energy-intensive industries and more efficient technologies in light of energy price increases (Figure 3). With slower price increases (and price

declines in some sectors) and growth of more energy-intensive industries, intensity declines moderated to an average of 1.3 percent per year between 1986 and 1999. Energy intensity is projected to decline at an average annual rate of 1.6 percent through 2020 as efficiency gains and structural shifts in the economy offset the expected growth in demand for energy services. The projected improvement is more rapid than in *AEO2000*, due to more rapid projected efficiency improvements in the industrial sector and growth in the non-energy-intensive industries.

Figure 3. Energy use per capita and per dollar of gross domestic product, 1970-2020 (index, 1970 = 1)



Energy use per person generally declined from 1970 through the mid-1980s, then rose as energy prices fell. Per capita energy use is projected to increase slightly in the forecast as efficiency gains only partially offset higher demand for energy services.

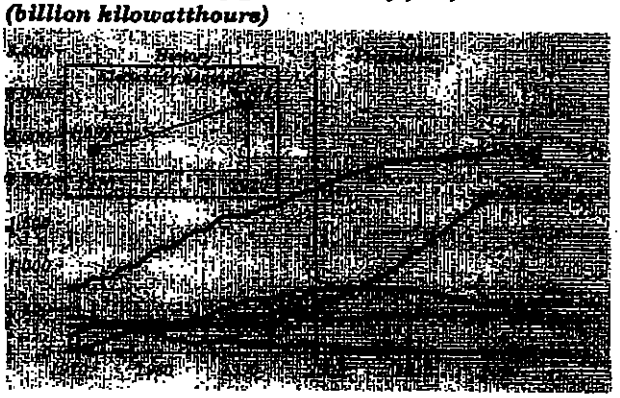
Electricity Generation

Electricity generation fueled by natural gas and coal is projected to increase through 2020 to meet growing demand for electricity and offset the projected retirement of existing nuclear units (Figure 4). The *AEO2001* projections for generation from natural gas, coal, and nuclear power are higher than in *AEO2000* as a result of higher projected electricity demand and improved operating costs and performance of nuclear plants. The share of natural gas generation is projected to increase from 16 percent in 1999 to 36 percent in 2020, and the coal share is projected to decline from 51 percent to 44 percent, because electricity industry restructuring favors the less capital-intensive and more efficient natural gas generation technologies.

Nuclear generating capacity is projected to decline from 1999 to 2020 but remains higher than in *AEO2000* due to a reevaluation of the costs of life extension and higher projected natural gas prices. Retirements of nuclear plants in the forecast are based on operating and life extension costs compared with the cost of new generating capacity. Of the 97 gigawatts of nuclear capacity available in 1999, 26 gigawatts is projected to be retired by 2020, and no new plants are expected to be constructed by 2020.

The use of renewable energy technologies for electricity generation is projected to grow slowly because of the relatively low costs of fossil-fired generation and because electricity restructuring favors less capital-intensive natural gas technologies over coal and baseload renewables. Where enacted, State renewable portfolio standards, which specify a minimum share of generation or sales from renewable sources, contribute to the expected growth of renewables. Total renewable generation, including cogenerators, is projected to increase by 0.7 percent per year and is similar to the projection in *AEO2000*.

Figure 4. Electricity generation by fuel, 1970-2020 (billion kilowatthours)

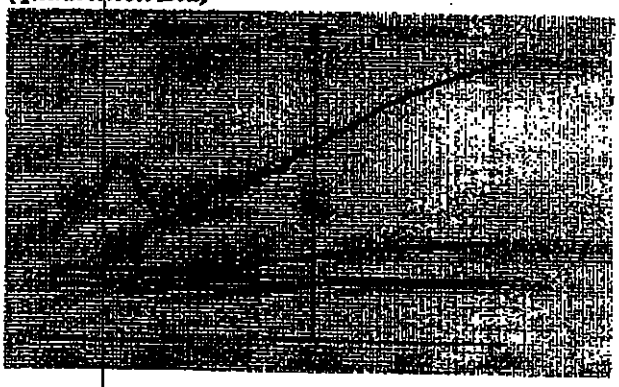


Production and Imports

U.S. crude oil production is projected to decline at an average annual rate of 0.7 percent from 1999 to 2020, to 5.1 million barrels per day. Advances in exploration and production technologies do not offset declining oil resources. This forecast is 0.2 million barrels per day lower in 2020 than in *AEO2000*. Projected production is higher in the earlier years of the forecast when projected prices are higher, contributing to lower production later. Projected increases in natural gas plant liquids production and refinery gains generally offset the decline in crude oil production (Figure 5). The share of petroleum demand met by net imports is projected to increase from 51 percent in 1999 (measured in barrels per day) to 64 percent in 2020, the same as in *AEO2000*, due to rising demand (Figure 6).

Figure 5. Energy production by fuel, 1970-2020 (quadrillion Btu)

Figure 6. Net energy imports by fuel, 1970-2020 (quadrillion Btu)



U.S. natural gas production is projected to increase from 18.7 trillion cubic feet in 1999 to 29.0 trillion cubic feet in 2020, an average annual rate of 2.1 percent, due to growing demand. Projected production is 2.6 trillion cubic feet higher in 2020 than in *AEO2000*. Net imports of natural gas, primarily from Canada, are projected to increase from 3.4 trillion cubic feet in 1999 to 5.8 trillion cubic feet in 2020. Net imports of liquefied natural gas are expected to increase to 0.7 trillion cubic feet by 2020 as two facilities in the United States—Elba Island, Georgia, and Cove Point, Maryland—are expected to reopen in 2003.

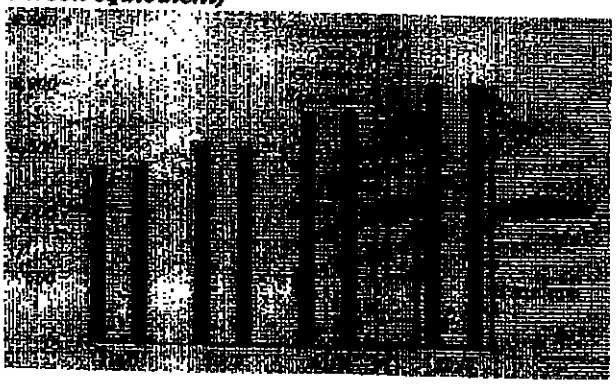
Coal production is projected to increase at an average annual rate of 0.9 percent, from 1,105 million tons in 1999 to 1,331 million tons in 2020, as projected domestic demand grows. Projected production in 2020 is 15 million tons higher than in *AEO2000*, due to higher demand. U.S. net coal exports are projected to decline through 2020, with European demand for U.S. coal expected to decline for environmental reasons and as a result of competition from other producers.

Renewable energy production is projected to increase from 6.6 quadrillion Btu in 1999 to 8.3 quadrillion Btu in 2020, with growth in geothermal, wind, biomass, and landfill gas generation, industrial biomass, and ethanol. Renewables production in 2020 is estimated to be 0.3 quadrillion Btu higher than in *AEO2000*, as a result of higher expected use of biomass in the industrial sector.

Carbon Dioxide Emissions

Carbon dioxide emissions from energy use are projected to increase at an average rate of 1.4 percent per year from 1,511 to 2,041 million metric tons carbon equivalent between 1999 and 2020 (Figure 7). Projected emissions in 2020 are higher by 62 million metric tons carbon equivalent than in *AEO2000*, due mainly to higher projected economic growth. Higher projected growth in households, commercial floorspace, industrial output, and disposable income leads to higher forecasts for end-use demand and electricity generation. Partly offsetting these trends are more rapid projected declines in industrial energy intensity and higher projected nuclear generation than in *AEO2000*.

Figure 7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 (million metric tons carbon equivalent)



The projections do not include future legislative or regulatory actions that might be taken to reduce carbon dioxide emissions but do include certain voluntary actions to reduce energy demand and emissions. Carbon dioxide emissions and international negotiations for emissions reductions are discussed on pages 45 and 97.

Table 1. Summary of results for five cases

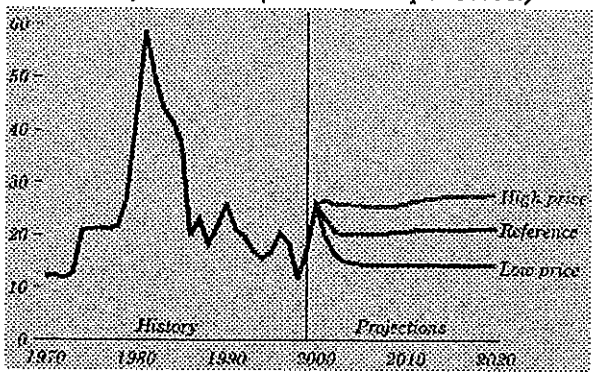
Sensitivity Factors	1998	1999	2020 Reference	2020 Low Economic Growth	2020 High Economic Growth	2020 Low World Oil Price	2020 High World Oil Price
Primary Production (quadrillion Btu)							
Petroleum	15.68	15.08	14.79	14.08	15.42	13.21	16.34
Natural Gas	19.19	19.16	29.79	27.44	31.17	28.99	29.80
Coal	23.76	23.09	26.95	25.97	29.42	26.20	27.66
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.62	6.58	8.31	7.91	8.75	8.19	8.37
Other	0.65	1.65	0.34	0.32	0.34	0.33	0.40
Total Primary Production	**73.10**	**73.35**	**86.30**	**81.64**	**91.40**	**83.02**	**88.67**
Net Imports (quadrillion Btu)							
Petroleum (including SPR)	20.95	21.12	35.22	32.18	38.76	39.57	32.38
Natural Gas	3.06	3.46	5.94	5.72	5.96	5.87	5.66
Coal/Other (- indicates export)	-1.41	-0.85	-0.47	-0.52	-0.36	-0.47	-0.47
Total Net Imports	**22.60**	**23.73**	**40.69**	**37.38**	**44.36**	**44.97**	**37.57**
Discrepancy	0.86	0.94	-0.04	0.05	-0.10	0.60	-0.17
Consumption (quadrillion Btu)							
Petroleum Products	37.16	38.03	50.59	46.73	54.82	52.74	49.49
Natural Gas	21.96	21.95	35.57	33.00	36.97	34.88	35.31
Coal	21.61	21.43	26.20	25.19	28.77	25.45	26.92
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.63	6.59	8.31	7.92	8.76	8.20	8.38
Other	0.29	0.34	0.23	0.23	0.23	0.23	0.23
Total Consumption	**94.84**	**96.14**	**127.03**	**118.98**	**135.86**	**127.39**	**126.42**
Prices (1999 dollars)							
World Oil Price (dollars per barrel)	12.02	17.35	22.41	21.16	23.51	15.10	28.42
Domestic Natural Gas at Wellhead (dollars per thousand cubic feet)	2.02	2.08	3.13	2.66	3.68	3.01	3.25
Domestic Coal at Minemouth (dollars per short ton)	18.02	16.98	12.70	12.79	12.80	12.84	12.87
Average Electricity Price (cents per kilowatthour)	6.8	6.7	6.0	5.6	6.4	5.9	6.1
Economic Indicators							
Real Gross Domestic Product (billion 1996 dollars)	8,516	8,876	16,515	14,757	18,202	16,565	16,474
(annual change, 1999-2020)	—	—	3.0%	2.5%	3.5%	3.0%	3.0%
GDP Chain-Type Price Index (index, 1996=1.00)	1.029	1.045	1.680	1.907	1.472	1.674	1.688
(annual change, 1999-2020)	—	—	2.3%	2.9%	1.6%	2.3%	2.3%
Real Disposable Personal Income (billion 1996 dollars)	6,165	6,383	11,842	10,907	12,739	11,902	11,786
(annual change, 1999-2020)	—	—	3.0%	2.6%	3.4%	3.0%	3.0%
Gross Manufacturing Output (billion 1992 dollars)	3,704	3,749	6,726	6,149	7,735	6,730	6,724
(annual change, 1999-2020)	—	—	2.8%	2.4%	3.5%	2.8%	2.8%
Energy Intensity							
(thousand Btu per 1996 dollar of GDP)	11.14	10.84	7.70	8.07	7.47	7.69	7.68
(annual change, 1999-2020)	—	—	-1.6%	-1.4%	-1.8%	-1.6%	-1.6%
Carbon Dioxide Emissions							
(million metric tons carbon equivalent)	1,495	1,511	2,041	1,916	2,193	2,051	2,033
(annual change, 1999-2020)	—	—	1.4%	1.1%	1.8%	1.5%	1.4%

Notes: Specific assumptions underlying the alternative cases are defined in the Economic Activity and International Oil Markets sections beginning on page 56. Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, supplemental natural gas, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. Some refinery inputs appear as petroleum product consumption. Other consumption includes net electricity imports, liquid hydrogen, and methanol.

Sources: Tables A1, A19, A20, B1, B19, B20, C1, C19, and C20.

Oil Prices Are Expected To Remain Above Low 1998 Levels

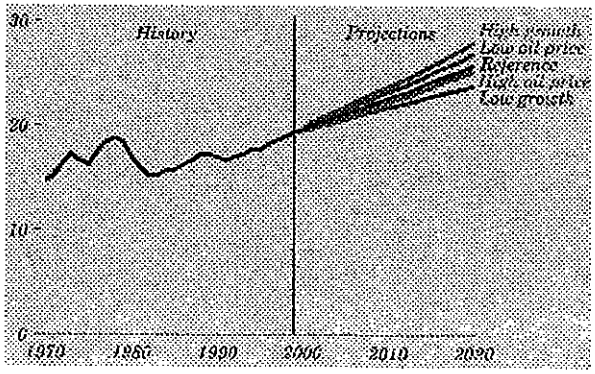
Figure 88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 (1999 dollars per barrel)



Because domestic prices for crude oil are determined largely by the international market, recovery from the 1998 decline in world oil prices led to a steep increase in wellhead prices for crude oil in the lower 48 States in 1999 and 2000. After 2000, prices are projected to decline initially, then increase through the rest of the forecast. Prices are expected to remain above 1998 levels in all cases, with wellhead prices projected to decrease by 0.6 percent per year on average from 1999 to 2020 in the low world oil price case and to increase by 1.3 and 2.5 percent per year on average in the reference and high world oil price cases, respectively (Figure 88).

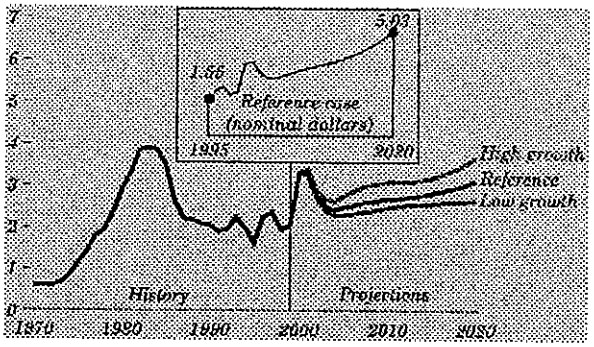
U.S. petroleum consumption is projected to rise in all the *AEO2001* cases (Figure 89). Total petroleum product supplied is projected to range from 23.8 million barrels per day in the low economic growth case to 28.0 million in the high growth case, as compared with 19.5 million barrels per day in 1999.

Figure 89. U.S. petroleum consumption in five cases, 1970-2020 (million barrels per day)



Rising Demand Increases Natural Gas Prices in All Economic Growth Cases

Figure 90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 (1999 dollars per thousand cubic feet)



Wellhead prices for natural gas in the lower 48 States are projected to increase on average by 1.2, 2.0, and 2.8 percent per year in the low economic growth, reference, and high economic growth cases, respectively (Figure 90). In the reference case, gas prices are projected to increase from $2.08 per thousand cubic feet in 1999 to $3.13 in 2020. The increases reflect the rising demand projected for natural gas and its expected impact on the natural progression of the discovery process from larger and more profitable fields to smaller, less economical ones. The projected price increases also reflect more production expected from higher cost sources, such as unconventional gas recovery. Growth in lower 48 unconventional gas production is projected to range from 2.5 to 3.5 percent per year across cases, compared with a projected range of 2.3 to 2.7 percent per year for conventional sources. Technically recoverable resources (Table 14) are expected to remain more than adequate overall to meet the projected production increases.

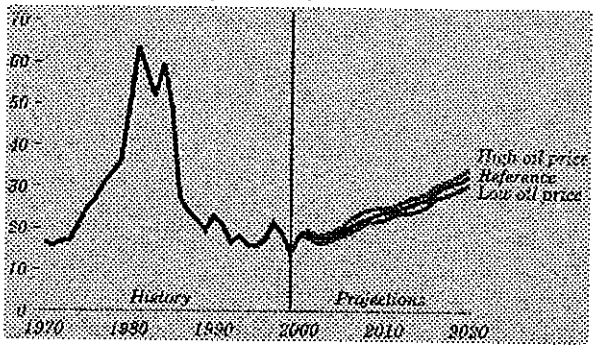
Although natural gas consumption (and thus production and prices) is projected to rise in all three cases, the price increases are expected to be tempered by the beneficial impacts of technological progress on both the discovery process and production operations.

Table 14. Technically recoverable U.S. oil and gas resources as of January 1, 1999

Total U.S. resources	Crude oil (billion barrels)	Natural gas (trillion cubic feet)
Proved	22	164
Unproved	121	1,117
Total	144	1,281

Rising Prices and Lower Drilling Costs Increase Well Completions

Figure 91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 (thousand successful wells)



Both exploratory drilling and developmental drilling are projected to increase in the forecast (Table 15). With rising prices and declining drilling costs, crude oil and natural gas well completions are projected to increase on average by 3.7 and 4.3 percent per year in the low and high oil price cases, respectively, compared with 4.0 percent in the reference case (Figure 91). The high growth rates projected for oil and gas drilling reflect, in part, the low level of drilling activity in 1999.

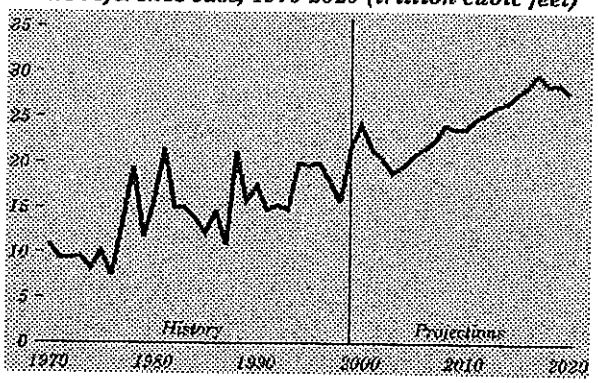
The productivity of natural gas drilling is not expected to decline as much as that of oil drilling, in part because total recoverable gas resources are more abundant than oil resources. At the projected production levels, however, undiscovered recoverable resources of conventional natural gas would decline rapidly in some areas, particularly in the onshore Gulf Coast and offshore Gulf of Mexico regions. The future overall productivity of both oil and gas drilling is necessarily uncertain, given the uncertainty associated with such factors as the extent of the Nation's oil and gas resources [*87*].

Table 15. Natural gas and crude oil drilling in three cases, 1999-2020 (thousand successful wells)

	1999	2000	2010	2020
Natural gas				
Low oil price case		12.8	16.5	22.2
Reference case	10.3	12.8	17.5	23.4
High oil price case		13.0	18.1	24.3
Crude oil				
Low oil price case		5.5	5.8	8.5
Reference case	4.1	5.5	6.5	9.4
High oil price case		5.5	7.0	10.2

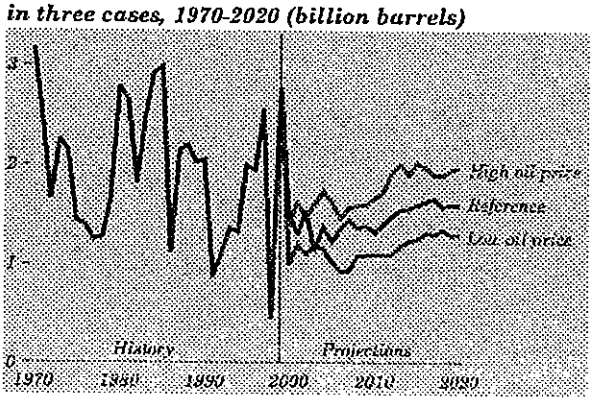
High Levels of Gas Reserve Additions Are Projected Through 2020

Figure 92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 (trillion cubic feet)



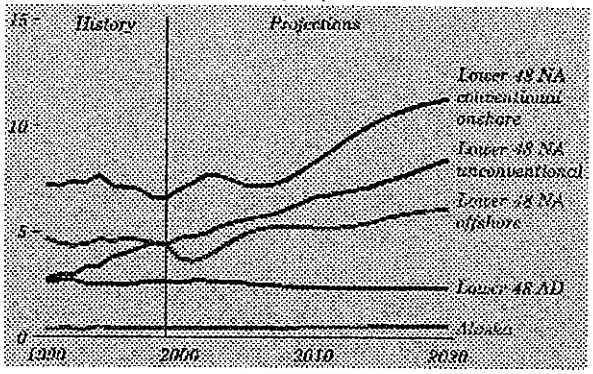
For most of the past two decades lower 48 production of both oil and natural gas has exceeded reserve additions, but the pattern for natural gas reversed from 1994 through 1997. Although reserve additions fell below production in 1998 with the decline in prices, they exceeded production again in 1999. After 2004, rising prices are projected to result in natural gas reserve additions that generally exceed production through 2020 (Figure 92), even with expected increases in demand. The relatively high projected levels of annual gas reserve additions through 2020 reflect an expected increase in exploratory and developmental drilling as a result of higher prices, as well as expected productivity gains from technology improvements comparable to those of recent years. For the most part, total lower 48 crude oil production is projected to continue to exceed total reserve additions (Figure 93), except in the later years in the high world oil price case.

Figure 93. Lower 48 crude oil reserve additions in three cases, 1970-2020 (billion barrels)



Significant New Finds Are Likely To Continue Increases in Gas Production

Figure 94. Natural gas production by source, 1990-2020 (trillion cubic feet)



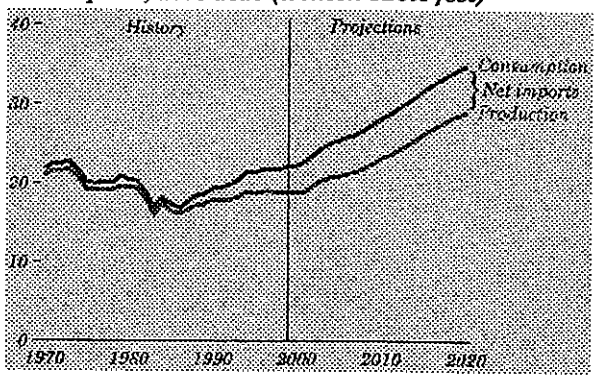
The continuing increase in domestic natural gas production in the forecast is expected to come primarily from lower 48 onshore nonassociated (NA) sources (Figure 94). Conventional onshore production is projected to grow rapidly from 2006 through 2020, increasing in share from 35.5 percent of total U.S. domestic production in 1999 to 39.2 percent of the total in 2020. Gas production from unconventional sources is projected to increase steadily over the forecast as a result of technology advances, playing a key role in meeting projected demand. Offshore production is projected to increase less rapidly but to remain a major source of domestic supply. Innovative use of cost-saving technology in recent years and the expected mid-term continuation of recent huge finds, particularly in the deep waters of the Gulf of Mexico, support the projections.

Natural gas production from Alaska is projected to grow by 1.5 percent per year through 2020, not including gas from the North Slope. The future of North Slope gas is uncertain, however. Current options under consideration include transporting the gas through a pipeline, converting it to liquefied natural gas, and converting it to synthetic petroleum products [*88*].

Production of associated-dissolved (AD) natural gas from lower 48 crude oil reservoirs generally declines in the projections, following the expected pattern of domestic crude oil production. AD gas is projected to account for 8.2 percent of total production in 2020, compared with 14.6 percent in 1999.

Net Imports of Natural Gas Grow in the Projections

Figure 95. Natural gas production, consumption, and imports, 1970-2020 (trillion cubic feet)



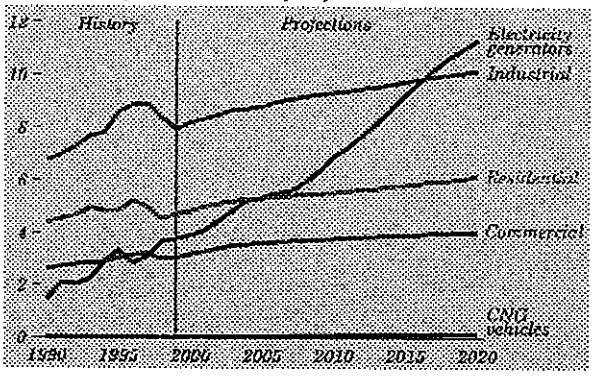
Net natural gas imports are expected to grow in the forecast (Figure 95) from 15.8 percent of total gas consumption in 1999 to 16.7 percent in 2020. Most of the increase is attributable to imports from Canada, which are projected to grow substantially. Most of the additional imports are expected to come from western Canada. In addition, new pipeline capacity is now providing access to eastern supplies. Natural gas from Sable Island, in the offshore Atlantic, began flowing on January 1, 2000.

Mexico has a considerable natural gas resource base, but its indigenous production is unlikely to increase sufficiently to satisfy rising demand. Since 1984, U.S. natural gas trade with Mexico has consisted primarily of exports. That trend is expected to continue throughout the forecast, especially in light of continuing additions to cross-border pipeline capacity. U.S. exports to Mexico are projected to grow from 60 billion cubic feet in 1999 to 520 billion cubic feet in 2020.

Imports of liquefied natural gas (LNG) are projected to increase by 8.0 percent per year on average, resulting in part from the expected reactivation of both the Elba Island terminal in Georgia and the Cove Point terminal in Maryland in 2003. LNG is not expected to grow beyond a regionally significant source of U.S. supply, however. LNG imports are projected to reach a level of 0.81 trillion cubic feet in 2020, compared with 0.16 trillion cubic feet in 1999.

Projected Increases in Natural Gas Use Are Led by Electricity Generators

Figure 96. Natural gas consumption by sector, 1990-2020 (trillion cubic feet)

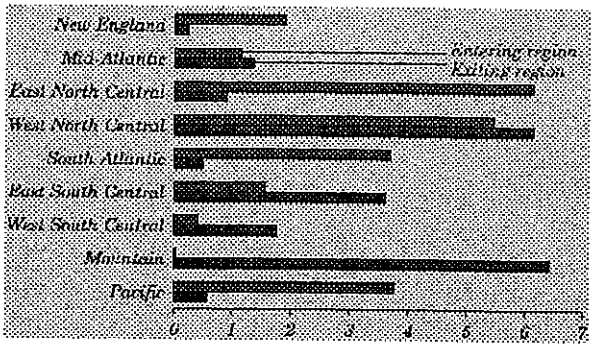


In all the *AEO2001* cases, total natural gas consumption is projected to increase from 1999 to 2020. The projections for domestic consumption in 2020 range from 32.2 trillion cubic feet per year in the low economic growth case to 36.1 trillion cubic feet in the high growth case, as compared with an estimated 21.4 trillion cubic feet in 1999. Although rising demand by electricity generators accounts for 57 percent of the increase in the reference case, growth is also expected in the residential, commercial, industrial, and transportation sectors (Figure 96). Natural gas consumption in the electricity generation sector is projected to grow steadily throughout the forecast as demand for electricity increases and retiring nuclear and older oil and gas steam plants are replaced by gas turbines and combined-cycle facilities.

In the reference case, natural gas consumption for electricity generation (excluding cogeneration) is projected to increase from 3.8 trillion cubic feet in 1999 to 11.3 trillion cubic feet in 2020. In 2017 electricity generation is projected to surpass the industrial sector as the largest consumer of natural gas. Although coal prices to the electricity generation sector are projected to fall throughout the forecast, lower capital costs, shorter construction lead times, higher efficiencies, and lower emissions are expected to give gas-fired generators an advantage over coal-fired plants for new capacity additions in most regions of the United States. Natural-gas-fired facilities are less capital-intensive than coal, nuclear, or renewable electricity generation plants. In addition, the environmental advantages of natural gas are expected to favor increased utilization of existing gas-fired power plants.

Gas Pipeline Capacity Expansion Is Needed To Serve New Markets

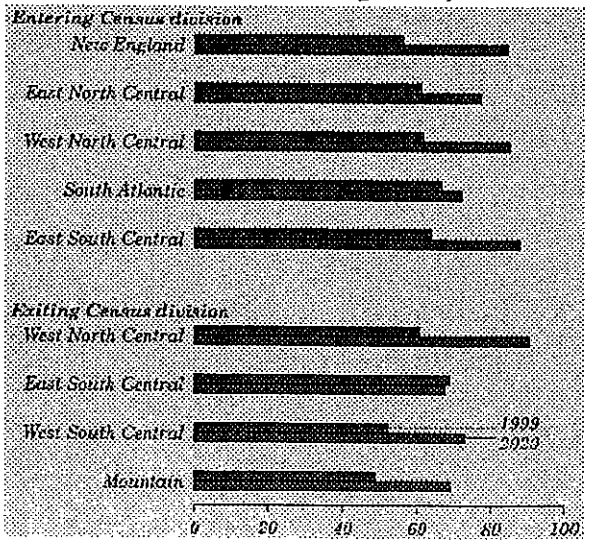
Figure 97. Projected pipeline capacity expansion by Census division, 1999-2020 (billion cubic feet per day)



Projected growth in natural gas consumption will require additional pipeline capacity. Expansion of interstate capacity (Figure 97) will be needed to provide access to new supplies and to serve expanding markets. Expansion is projected to proceed at an average rate of 1.0 percent per year in the forecast.

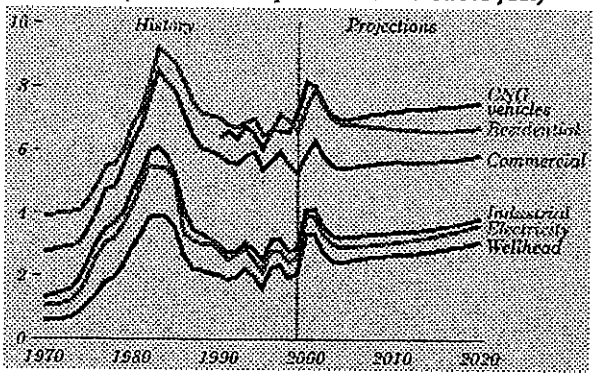
The greatest increases in capacity are expected along the corridors that provide access to Canadian, Gulf Coast, and Mountain region supplies and deliver them to the South Atlantic, Pacific, and Northeast regions. In all regions, growth in new pipeline construction is expected to be tempered by higher utilization of existing pipeline capacity (Figure 98).

Figure 98. Projected pipeline capacity utilization by Census division, 1999 and 2020 (percent)



Competitive Markets Keep Residential Gas Prices in Check

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



Consumer prices for natural gas in all the end-use sectors are projected to be higher in 2020 that they were in 1999 (Figure 99), but prices in the residential and transportation sectors are expected to remain within 5 percent of 1999 levels. The limited price increases in the forecast reflect expectations for declining distribution margins, due in part to anticipated efficiency improvements in an increasingly competitive market. Margins in the industrial sector are projected to remain relatively constant, and growth in end-use prices is expected to result mainly from wellhead price increases. In the electricity generation sector, expected increases in both pipeline margins and wellhead prices combine to yield a projected 1.6-percent average annual increase in end-use prices.

Compared with their rise and decline over the 1970 to 1999 period, transmission and distribution revenues in the natural gas industry are projected to grow relatively steadily from 2000 forward, increasing overall at an average rate of 1.1 percent per year (Table 16). Declines in margins are expected to be balanced by higher volumes.

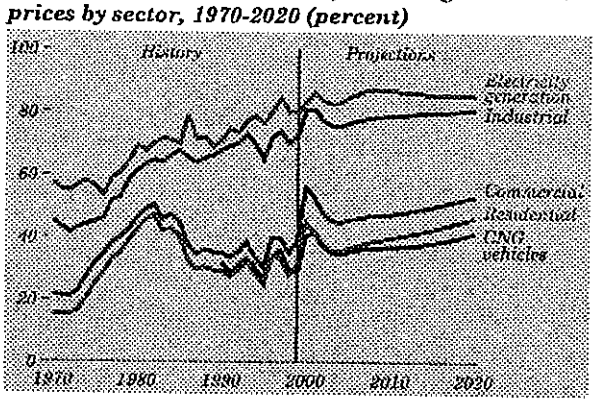
Table 16. Transmission and distribution revenues and margins, 1970-2020

	1970	1985	1999	2010	2015	2020
T&D revenues (billion 1999 dollars)	30.73	49.62	39.86	44.59	47.01	49.82
End-use consumption (trillion cubic feet)	19.21	15.97	21.41	28.05	31.61	34.73
Average margin* (1999 dollars per thousand cubic feet)	1.62	3.14	2.04	1.74	1.63	1.57

*Revenue divided by end-use consumption.

Distribution Costs Claim a Smaller Share of Residential Gas Prices

Figure 100. Wellhead share of natural gas end-use prices by sector, 1970-2020 (percent)



With distribution margins projected to decline, the wellhead shares of end-use prices generally increase in the forecast (Figure 100). The greatest impact is expected in the residential and commercial markets, where most customers purchase gas through local distribution companies (LDCs). In the electricity generation sector, the majority of customers do not purchase from distributors.

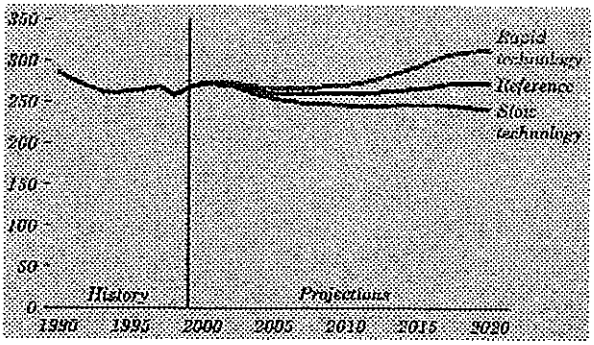
Changes have been seen historically in all components of end-use prices (Table 17). Pipeline margins dropped significantly between 1985 and 1999 with industry restructuring, and the decline is projected to continue through 2010. From 2010 to 2020, pipeline margins are projected to remain relatively flat. LDC margins in the residential and commercial sectors were above 1985 levels in 1999, but efficiency improvements and other impacts of restructuring are expected to exert downward pressure on distribution costs, and lower margins are projected for both the residential and commercial sectors in 2010 and 2020.

Table 17. Components of residential and commercial natural gas end-use prices, 1985-2020 (1999 dollars per thousand cubic feet)

Price Component	1985	1999	2010	2020
Wellhead price	3.38	2.08	2.69	3.13
Citygate price	5.05	3.10	3.60	4.04
Pipeline margin	1.67	1.02	0.91	0.91
LDC margin				
Residential	3.19	3.59	3.10	2.69
Commercial	2.36	2.39	2.05	1.82
End-use price				
Residential	8.24	6.69	6.70	6.73
Commercial	7.41	5.49	5.65	5.86

Technology Advances Could Improve Finding and Drilling Success Rates

Figure 101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 (quadrillion Btu)



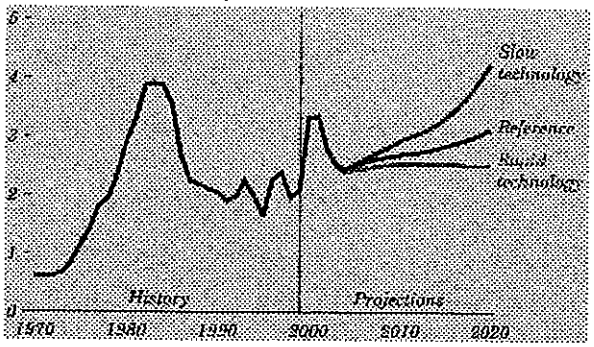
In the forecast, major advances in data acquisition, data processing, and the display and integration of seismic data with other geologic data—combined with lower cost computer power and experience gained with new techniques—are projected to continue putting downward pressure on costs while significantly improving finding and success rates. Effective use of improved exploration and production technologies to aid in the discovery and development of resources—particularly, unconventional gas and offshore deepwater fields—will be needed if new reserves are to replace those depleted by production.

Alternative cases assess the sensitivity of the projections to changes in success rates, exploration and development costs, and finding rates as a result of technological progress. The assumed technology improvement rates increase and decrease by 25 percent in the rapid and slow technology cases, which are analyzed as fully integrated model runs. All other parameters in the model are at their reference case values, including technology parameters in other energy markets, parameters affecting foreign oil supply, and assumptions about foreign natural gas trade, excluding Canada.

Although gas reserves are projected to make up a slightly larger share of the total in the reference case, total hydrocarbon reserve additions are expected to offset production, keeping total reserves essentially constant throughout the forecast (Figure 101). By 2020, reserves are projected to be 14.4 percent higher in the rapid technology case than in the reference case and 11.3 percent lower in the slow technology case.

Gas Price Projections Change With Technology Assumptions

Figure 102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 (1999 dollars per thousand cubic feet)



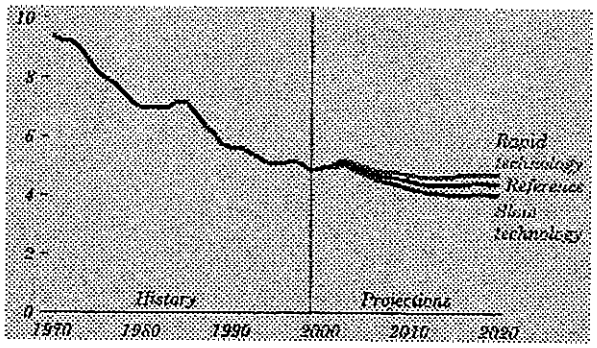
The natural gas price projections are highly sensitive to changes in assumptions about technological progress (Figure 102). Lower 48 wellhead prices are projected to increase at an average annual rate of 3.4 percent in the slow technology case, compared with only 2.0 percent in the reference case, over the projection period. In the rapid technology case, average natural gas wellhead prices are projected to remain relatively flat through 2020 at about $2.50 per thousand cubic feet.

Through 2003, the projections of both price and production levels for lower 48 oil and natural gas are almost identical in the reference case and the two technological progress cases. By 2020, however, natural gas prices are projected to be 35.1 percent higher (at $4.23 per thousand cubic feet) in the slow technology case and 20.1 percent lower (at $2.50 per thousand cubic feet) in the rapid technology case than the reference case level of $3.13 per thousand cubic feet.

Unlike the projections for natural gas prices, those for lower 48 average wellhead prices for crude oil do not vary significantly across the technology cases. In both the rapid and slow technology cases, the projections for crude oil prices vary from the reference case projections by at most $0.14 per barrel. Domestic oil prices are determined largely by the international market; changes in U.S. oil production do not constitute a significant volume relative to the global market.

More Rapid Technology Advances Could Raise Oil Production Slightly

Figure 103. Lower 48 crude oil production in three technology cases, 1970-2020 (million barrels per day)



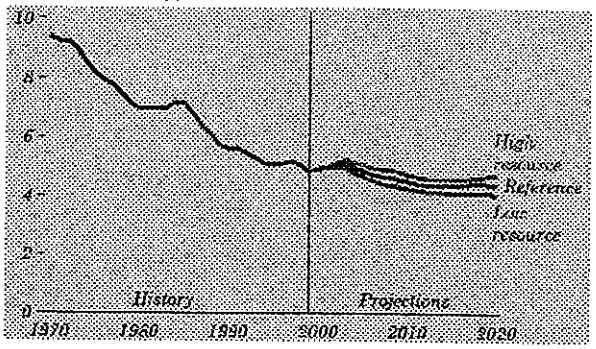
Projections for domestic oil production also are sensitive to changes in technological progress assumptions (Figure 103). In comparison with the projected lower 48 production level of 4.4 million barrels per day in 2020 in the reference case, oil production is projected to increase to 4.7 million barrels per day in the rapid technology case and to decrease to 4.0 million barrels per day in the slow technology case.

Given the assumption that changes in the levels of technology affect only U.S. oil producers, total oil supply adjusts to the variations in technological progress assumptions primarily through changes in imports of crude oil and other petroleum products. Net imports in 2020 are projected to range from a low of 16.1 million barrels per day in the rapid technology case to a high of 17.4 million barrels per day in the slow technology case.

Offshore oil production in the lower 48 States shows more sensitivity than onshore production to changes in technological progress assumptions, because large deepwater fields that are not economically feasible in the slow technology case are projected to become profitable in the rapid technology case. Cumulative offshore production from 1999 through 2020 is projected to be about 745 million barrels (4.9 percent) higher in the rapid technology case than in the reference case and 922 million barrels (6.0 percent) lower in the slow technology case than in the reference case. For onshore production, in contrast, the projected differences are only 3.5 percent and 3.6 percent. The projections for Alaskan oil production vary by about 3.9 percent from the reference case in both the rapid and slow technology cases.

Oil Production Forecasts Vary, Depending on Resource Estimates

Figure 104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 (million barrels per day)



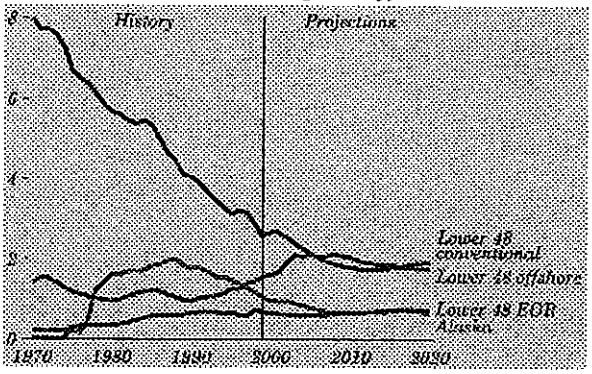
Another important assumption for the projections of domestic oil and gas resources is the size of the domestic resource base. Two alternative cases were used to evaluate the impacts of uncertainty in the resource estimates. In the high and low resource sensitivity cases, the estimates for both undiscovered technically recoverable resources and inferred reserves for conventional onshore and offshore production were increased and decreased, respectively, by 20 percent. As in the other *AEO2001* cases, resources in areas currently restricted from exploration and development were excluded from the resource assumption.

In the high resource case, both oil production levels and industry profits are projected to increase over those projected in the reference case. Lower 48 crude oil production is projected to reach 4.8 million barrels per day in 2020, as compared with 4.4 million barrels per day projected in the reference case (Figure 104). The corresponding projection in the low resource case is 4.0 million barrels per day.

The variations in oil production projections in the two resource sensitivity cases lead to similar variations in the projections of oil import dependence. In the high resource case, with higher projected production levels, net petroleum imports are projected to make up 62 percent of domestic supply in 2020, compared with 64 percent in the reference case. In the low resource case, with lower projected domestic production, imports are projected to make up 68 percent of domestic supply.

Domestic Crude Oil Production Continues To Decline

Figure 105. Crude oil production by source, 1970-2020 (million barrels per day)

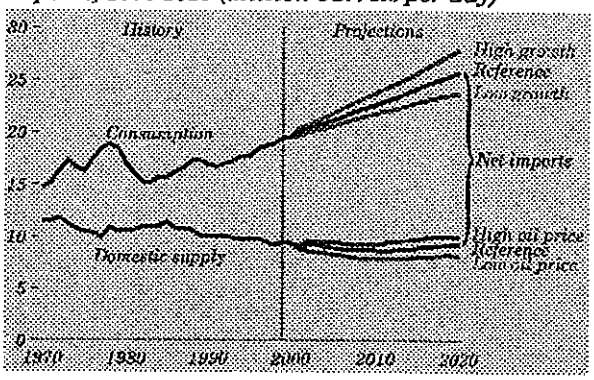


Domestic crude oil production is projected to remain relatively stable from 1999 through 2003 as a result of a favorable price environment and increased success of offshore drilling (Figure 105). A decline in production is projected from 2004 through 2010, followed by another period of projected stable production levels through 2020 as a result of rising prices and continuing improvements in technology [*89*]. In 2020, the projected domestic production level of 5.1 million barrels per day is 0.8 million barrels per day less than the 1999 level.

Conventional onshore production in the lower 48 States, accounting for 44 percent of total U.S. crude oil production in 1999, is projected to decrease to 38 percent in 2020, with production from mature areas expected to decline. Offshore production is projected to range from 1.6 to 2.1 million barrels per day throughout the forecast, surpassing the projected level of lower 48 conventional onshore production from 2006 to 2016. Crude oil production from Alaska is expected to decline at an average annual rate of 2.4 percent between 1999 and 2020. Projected drops in production from most of Alaska's oil fields—particularly Prudhoe Bay, the State's largest producing field—are expected to be offset by production from the National Petroleum Reserve–Alaska (NPRA), which is projected to commence in 2010. Production from the Alaska National Wildlife Refuge (ANWR) is not included, because drilling in the area is currently prohibited. Production from enhanced oil recovery (EOR) [*90*] is expected to slow as it becomes less profitable when oil prices fall in the forecast through 2003, and then to increase along with the world oil price projections until close to the end of the forecast.

Imports Fill the Gap Between Domestic Supply and Demand

Figure 106. Petroleum supply, consumption, and imports, 1970-2020 (million barrels per day)



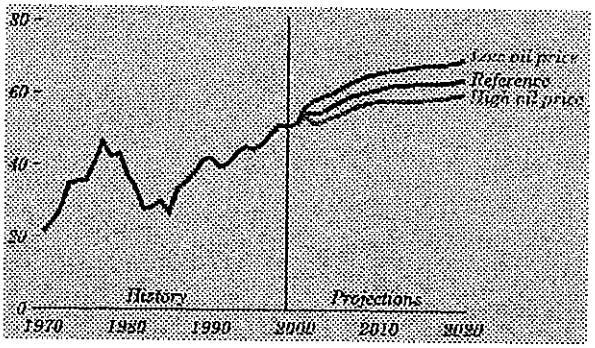
In the reference case, domestic petroleum supply is projected to decline slightly from its 1999 level of 9.5 million barrels per day to 9.3 million barrels per day in 2020 (Figure 106). As U.S. crude oil production falls off, refinery gain and production of natural gas plant liquids are projected to increase. Domestic supply in 2020 is projected to drop to 8.2 million barrels per day in the low oil price case and to rise to 10.1 million barrels per day in the high oil price case.

The greatest variation in petroleum consumption levels is seen across the economic growth cases, with a projected increase of 8.5 million barrels per day over the 1999 level in the high growth case, compared with a projected increase of only 4.4 million barrels per day in the low growth case.

Additional petroleum imports would be needed to fill the projected widening gap between supply and consumption. The greatest gap between supply and consumption is projected in the low world oil price case and the smallest in the low economic growth case. The projections for net petroleum imports in 2020 range from a high of 18.8 million barrels per day in the low oil price case to a low of 15.0 million barrels per day in the low growth case, compared with the 1999 level of 10.0 million barrels per day. The expected value of petroleum imports in 2020 ranges from $115.8 billion in the low price case to $170.8 billion in the high economic growth case. Total annual U.S. expenditures for petroleum imports, which reached a historical peak of $138.9 billion (in 1999 dollars) in 1980 [*91*], were $60.2 billion in 1999.

Growing Dependence on Petroleum Imports Is Projected

Figure 107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 (percent)



In 1999, net imports of petroleum accounted for 51 percent of domestic petroleum consumption. Continued dependence on petroleum imports is projected, reaching 64 percent in 2020 in the reference case (Figure 107). The corresponding import shares of total consumption in 2020 are projected to be 60 percent in the high oil price case and 70 percent in the low price case.

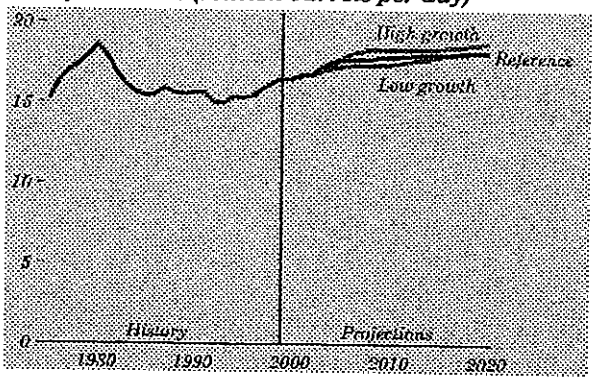
Although crude oil is expected to continue as the major component of petroleum imports, refined products are projected to represent a growing share. More imports would be needed as the projected growth in demand for refined products exceeds the expansion of domestic refining capacity. Refined products are projected to make up 19 percent of net petroleum imports in 2020 in the low economic growth case and 32 percent in the high growth case, as compared with their 13-percent share in 1999 (Table 18).

Table 18. Petroleum consumption and net imports in five cases, 1999 and 2020 (million barrels per day)

Year and projection	Product supplied	Net imports	Net crude imports	Net product imports
1999	19.5	9.9	8.6	1.3
2020				
Reference	25.8	16.5	12.1	4.4
Low oil price	27.0	18.8	13.3	5.5
High oil price	25.3	15.2	11.5	3.7
Low growth	23.9	15.0	12.1	2.9
High growth	28.0	18.2	12.5	5.8

New U.S. Oil Refining Capacity Is Likely To Be at Existing Refineries

Figure 108. Domestic refining capacity in three cases, 1975-2020 (million barrels per day)



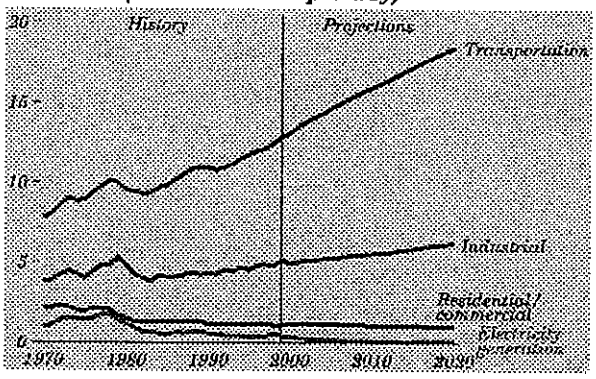
Falling demand for petroleum and the deregulation of the domestic refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity. That trend was reversed in 1995, and 1.2 million barrels per day of distillation capacity had been added by 2000. Financial and legal considerations make it unlikely that new refineries will be built in the United States, but additions at existing refineries are expected to increase total U.S. refining capacity in all the *AEO2001* cases (Figure 108).

Distillation capacity is projected to grow from the 1999 year-end level of 16.5 million barrels per day to 18.2 million in 2020 in the low economic growth case and 18.8 million in the high growth case, compared with the 1981 peak of 18.6 million barrels per day. Almost all the capacity additions are projected to occur on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively throughout the forecast, in a range from 91 percent to 95 percent of design capacity. In comparison, the 1999 utilization rate was 93 percent, well above the rates of the 1980s and early 1990s.

Additional "downstream" processing units are expected to allow domestic refineries to produce less residual fuel, which has a shrinking market, and more higher value "light product" such as gasoline, distillate, jet fuel, and liquefied petroleum gases.

Petroleum Use Increases Mainly in the Transportation Sector

Figure 109. Petroleum consumption by sector, 1970-2020 (million barrels per day)



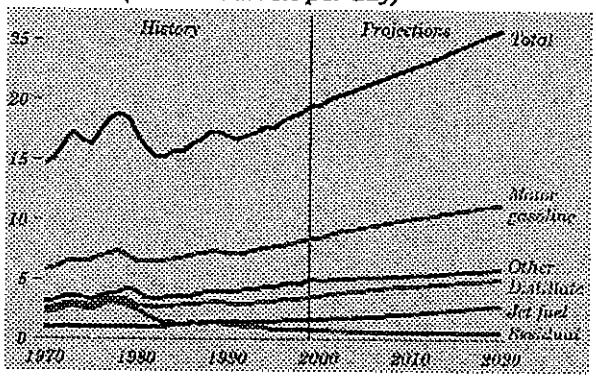
U.S. petroleum consumption is projected to increase by 6.3 million barrels per day between 1999 and 2020. Most of the increase is expected in the transportation sector, which accounted for two-thirds of U.S. petroleum use in 1999 (Figure 109). Petroleum use for transportation is projected to increase by 5.6 million barrels per day in the reference case, 4.3 million in the low economic growth case, and 7.0 million in the high economic growth case.

In the industrial sector, which currently accounts for 26 percent of U.S. petroleum use, consumption in 2020 is projected to be higher than the 1999 level by 1.1 million barrels per day in the reference case, by 0.4 million in the low economic growth case, and by 1.9 million in the high economic growth case. About 84 percent of the growth is expected in the petrochemical, construction, and refining sectors.

In the reference case, petroleum use for heating and for electricity generation is expected to decline as oil loses market share to natural gas. Increased oil use for heating and electricity generation is projected, however, in the low oil price case. Natural gas use for home heating is growing in New England, the last stronghold of heating oil. Compared with 1999, heating oil use is projected to be 150,000 barrels per day lower in 2020 in the high price case and 90,000 barrels per day higher in the low price case. For electricity generation, oil-fired steam plants are being retired in favor of natural gas combined-cycle units. Oil use for electricity generation (excluding cogeneration) is projected to be 320,000 barrels per day lower in 2020 than in 1999 in the high price case and 110,000 barrels per day higher in the low price case.

Light Products Account for Most of the Increase in Demand for Petroleum

Figure 110. Consumption of petroleum products, 1970-2020 (million barrels per day)

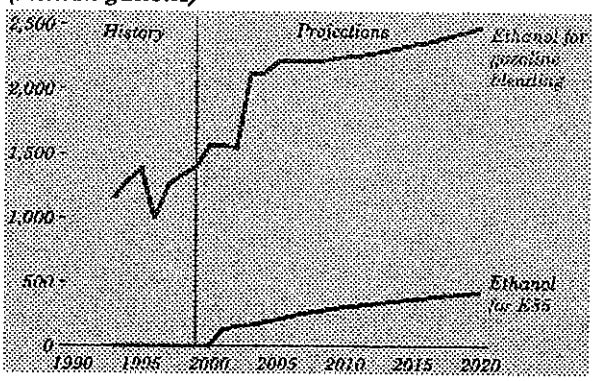


About 96 percent of the projected growth in petroleum consumption stems from increased consumption of "light products," including gasoline, diesel, heating oil, jet fuel, and liquefied petroleum gases, which are more difficult and costly to produce than heavy products (Figure 110). Although refinery investments and enhancements are expected to increase the ability of domestic refineries to produce light products, imports of light products are expected to more than triple by 2020.

In the forecast, gasoline continues to account for almost 45 percent of all the petroleum used in the United States. Between 1999 and 2020, U.S. gasoline consumption is projected to rise from 8.4 million barrels per day to 11.3 million barrels per day. Consumption of distillate fuel is projected to be 1.6 million barrels per day higher in 2020 than it was in 1999, with diesel fuel accounting for 92 percent of the projected increase as demand for freight transportation grows. With air travel also expected to increase, jet fuel consumption is projected to be 1.2 million barrels per day higher in 2020 than in 1999. Consumption of liquefied petroleum gas (LPG), included in "other" petroleum, is projected to increase by about 360,000 barrels per day between 1999 and 2020. Consumption of "other" petroleum products—including petrochemical feedstocks, still gas used to fuel refineries, asphalt and road oil, and other miscellaneous products—is projected to grow by 490,000 barrels per day. Residual fuel use, mainly for electricity generation, is projected to decline from 820,000 barrels per day in 1999 to 600,000 barrels per day in 2020.

State Bans on MTBE Are Expected To Result in Increased Use of Ethanol

Figure 111. U.S. ethanol consumption, 1993-2020 (million gallons)



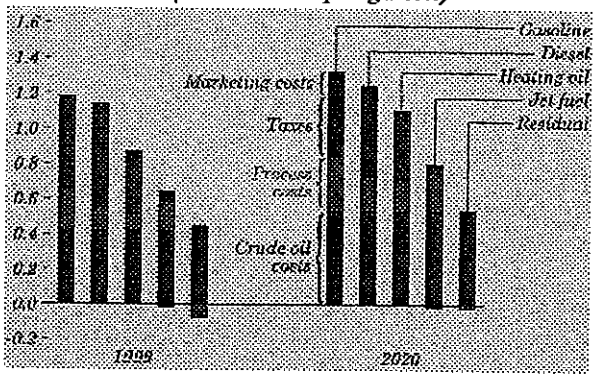
U.S. ethanol production, with corn as the primary feedstock, reached 1.5 billion gallons in 1999. Production is projected to increase to 2.9 billion gallons by 2020, with most of the growth coming from the conversion of cellulosic biomass to ethanol. Ethanol is used primarily in the Midwest as a gasoline volume extender and octane enhancer in a blend of 10 percent ethanol and 90 percent gasoline. It also serves as an oxygenate in areas that are required to use oxygenated fuels (with a minimum 2.7 percent oxygen content by volume) during the winter months to reduce carbon monoxide emissions.

AEO2001 projects an expanded role for ethanol, replacing MTBE as the oxygenate for reformulated gasoline (RFG) in the eight States that have passed legislation limiting the use of MTBE because of concerns about groundwater contamination. The reference case assumes that the Federal requirement for a 2-percent oxygen content in RFG will continue in all States. Ethanol consumption in E85 vehicles is also projected to increase, from the national total of 2.0 million gallons in 1999 to 421 million gallons in 2020 (Figure 111). E85 vehicles are currently in use as government fleet vehicles, flexible-fuel passenger vehicles (which run on either E85 or gasoline), and urban transit buses.

The Federal Highway Bill of 1998 extended the current excise tax exemption for ethanol through 2007 but stipulated reductions from 54 cents per gallon to 53 cents in 2001, 52 cents in 2003, and 51 cents in 2005. *AEO2001* assumes that the exemption will be extended at 51 cents per gallon (nominal) through 2020.

Processing Costs for Most Petroleum Products Rise in the Forecast

Figure 112. Components of refined product costs, 1999 and 2020 (1999 dollars per gallon)

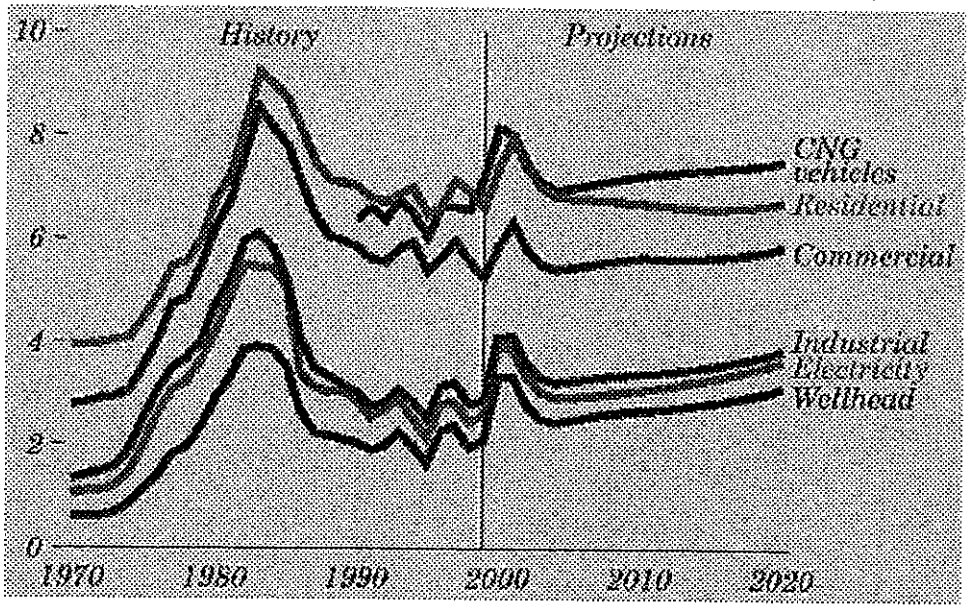


Refined product prices are determined by crude oil costs, refining process costs (including refiner profits), marketing costs, and taxes (Figure 112). In the *AEO2001* projections, crude oil costs are projected to continue making the greatest contribution to product prices and marketing costs are projected to remain stable, but the contributions of processing costs and taxes are expected to change considerably.

The processing costs for light products, including gasoline, diesel fuel, heating oil, and jet fuel, are projected to increase by 6 to 7 cents per gallon between 1999 and 2020. The expected increases are attributed primarily to the projected growth in demand for those products, investment needed to meet new Federal requirements for low-sulfur gasoline between 2004 and 2007, and investments related to compliance with refinery emissions, health, and safety regulations.

Whereas processing costs tend to increase refined product prices in the forecast, assumptions about Federal taxes tend to slow the growth of motor fuels prices. In keeping with the *AEO2001* assumption of current laws and legislation, Federal motor fuels taxes are assumed to remain at nominal 1999 levels throughout the forecast, although Federal taxes have actually been raised sporadically in the past. State motor fuels taxes are assumed to keep up with inflation, as they have in the past. The net impact of the assumptions is an expected decrease in Federal taxes (in 1999 dollars) between 1999 and 2020—7 cents per gallon for gasoline, 9 cents for diesel fuel, and 1 cent for jet fuel.

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



History: Energy Information Administration, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). **Projections:** Table A14.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts				
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AGA	NPC
2015								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	2.83	2.59	3.20	2.64	1.89	2.79	2.56	3.67
Dry gas production[b]	26.24	24.63	27.86	24.43	28.58	24.00	26.71	26.50
Net imports	5.50	5.35	5.62	5.35	4.01	5.70	4.15	4.70
Consumption	31.61	29.85	33.36	30.18	32.78	29.46	30.86	31.84
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5.93	6.07
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3.95	4.09
Industrial[e]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10.72	10.76
Electricity generators[f]	9.30	8.54	9.97	11.63[e]	8.72	9.26[f]	7.06	7.76
Other[h]	2.78	2.68	2.92	2.57	3.27	2.75	3.20	3.16[i]
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6.31[j]	7.65
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.03	5.07[j]	6.76
Industrial[e]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.09[l]	4.86[k]
Electricity generators[f]	3.30	3.05	3.67	3.12[e]	2.55	3.24	2.99[j]	4.21
2020								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	3.13	2.66	3.68	2.72	NA	3.07	NA	NA
Dry gas production[b]	29.04	26.74	30.38	25.72	NA	25.13	NA	NA
Net imports	5.80	5.58	5.82	5.72	NA	6.00	NA	NA
Consumption	34.72	32.22	36.09	31.82	NA	28.58	NA	NA
Residential	6.14	5.95	6.21	5.88	NA	5.84	NA	NA
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	NA	NA
Industrial[e]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	NA	NA
Electricity generators[f]	11.34	10.23	11.29	12.72[e]	NA	9.89[e]	NA	NA
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	NA	NA
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.73	6.32	7.24	7.44	NA	7.25	NA	NA
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	NA	NA
Industrial[e]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	NA	NA
Electricity generators[f]	3.66	3.17	4.17	3.20[e]	NA	3.52	NA	NA

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore, forecast values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,029 Btu per cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: *AEO2001*: AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case), LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). WEFA: The WEFA Group, *Natural Gas Outlook* (2000). GRI: Gas Research Institute, *GRI Baseline Projection of U.S. Energy Supply and Demand*, 2000 Edition (January 2000). DRI: Standard & Poor's DRI, *U.S. Energy Outlook* (Spring/Summer 2000). AGA: American Gas Association, *1999 AGA-TERA Base Case* (December 1999). NPC: National Petroleum Council, *Natural Gas, Meeting the Challenges of the Nation's Growing Natural Gas Demand* (December 1999).

Table A3. Energy Prices by Sector and Source
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Residential	13.64	13.17	12.93	13.16	13.33	13.59	0.1%
Primary Energy[1]	6.87	6.72	7.12	7.01	6.92	7.01	0.2%
Petroleum Products[2]	7.53	7.56	9.16	9.37	9.49	9.64	1.2%
Distillate Fuel	6.25	6.27	7.33	7.51	7.60	7.96	1.2%
Liquefied Petroleum Gas	10.45	10.36	12.83	13.07	12.83	12.87	1.0%
Natural Gas	6.74	6.52	6.63	6.53	6.44	6.55	0.0%
Electricity	24.24	23.60	21.90	21.88	22.01	22.17	-0.3%
Commercial	13.53	13.25	12.39	11.75	11.96	12.37	-0.3%
Primary Energy[1]	5.26	5.22	5.35	5.53	5.55	5.74	0.5%
Petroleum Products[2]	4.66	5.00	6.01	6.17	6.34	6.50	1.3%
Distillate Fuel	4.01	4.37	5.12	5.28	5.55	5.76	1.3%
Residual Fuel	2.42	2.63	3.64	3.69	3.77	3.85	1.8%
Natural Gas[3]	5.47	5.34	5.31	5.50	5.60	5.71	0.3%
Electricity	22.17	21.54	19.58	17.63	17.72	18.12	-0.8%
Industrial[4]	4.97	5.33	5.49	5.45	5.56	5.85	0.4%
Primary Energy	3.51	3.92	4.25	4.38	4.48	4.72	0.9%
Petroleum Products[2]	4.79	5.55	5.95	6.05	6.10	6.27	0.6%
Distillate Fuel	4.11	4.85	5.29	5.45	5.73	5.94	1.2%
Liquefied Petroleum Gas	7.27	8.50	7.94	8.01	7.75	7.83	-0.4%
Residual Fuel	2.58	2.78	3.36	3.42	3.50	3.58	1.2%
Natural Gas[5]	2.73	2.79	3.17	3.31	3.45	3.76	1.4%
Metallurgical Coal	1.73	1.65	1.59	1.54	1.49	1.44	-0.7%
Steam Coal	1.49	1.43	1.35	1.29	1.25	1.21	-0.8%
Electricity	13.34	13.09	12.34	11.24	11.27	11.62	-0.6%
Transportation	7.70	8.30	9.27	9.46	9.38	9.31	0.5%
Primary Energy	7.68	8.29	9.25	9.45	9.36	9.29	0.5%
Petroleum Products[2]	7.68	8.28	9.25	9.44	9.36	9.29	0.5%
Distillate Fuel[6]	7.66	8.22	8.89	8.94	9.05	8.98	0.4%
Jet Fuel[7]	4.13	4.70	5.25	5.47	5.76	5.88	1.1%
Motor Gasoline[8]	8.74	9.45	10.64	10.93	10.75	10.68	0.8%
Residual Fuel	2.29	2.46	3.10	3.18	3.25	3.33	1.5%
Liquefied Petroleum Gas[9]	11.23	12.87	14.19	14.28	13.96	13.84	0.3%
Natural Gas[10]	6.40	7.02	6.80	7.04	7.17	7.32	0.2%
Ethanol (E85)[11]	14.25	14.42	19.12	19.00	19.24	19.36	1.4%
Methanol (M85)[12]	8.93	10.38	13.12	13.74	14.33	14.43	1.6%
Electricity	15.86	15.57	14.33	13.47	13.21	13.06	-0.8%
Average End-Use Energy	8.26	8.55	8.91	8.95	9.01	9.17	0.3%
Primary Energy	5.89	6.33	7.00	7.16	7.21	7.30	0.7%
Electricity	20.03	19.50	18.15	17.20	17.30	17.59	-0.5%
Electric Generators[13]							
Fossil Fuel Average	1.50	1.49	1.52	1.54	1.68	1.88	1.1%
Petroleum Products	2.32	2.50	3.70	4.11	4.27	4.35	2.7%
Distillate Fuel	3.25	4.06	4.65	4.84	5.10	5.28	1.3%
Residual Fuel	2.22	2.42	3.52	3.88	4.00	4.07	2.5%
Natural Gas	2.41	2.55	2.88	3.03	3.24	3.59	1.6%
Steam Coal	1.27	1.21	1.13	1.05	1.01	0.96	-1.0%

Table A8. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Generation by Fuel Type							
Electric Generators[1]							
Coal	1826	1833	2085	2196	2246	2298	1.1%
Petroleum	115	100	32	17	17	19	-7.7%
Natural Gas[2]	346	371	584	900	1286	1567	7.2%
Nuclear Power	674	730	740	720	639	574	-1.1%
Pumped Storage	-2	-1	-1	-1	-1	-1	N/A
Renewable Sources[3]	359	353	370	390	395	396	0.5%
Total	3317	3386	3810	4222	4583	4872	1.7%
Nonutility Generation for Own Use	16	16	17	16	16	16	-0.0%
Distributed Generation	0	0	1	3	4	6	N/A
Cogenerators[4]							
Coal	52	47	52	52	52	52	0.5%
Petroleum	15	9	10	10	10	10	0.4%
Natural Gas	197	206	239	257	276	299	1.8%
Other Gaseous Fuels[5]	8	4	6	7	7	8	3.3%
Renewable Sources[3]	31	31	34	39	44	48	2.0%
Other[6]	8	5	5	5	5	5	0.3%
Total	310	302	347	370	394	422	1.6%
Other End-Use Generators[7]	6	5	5	5	5	5	0.6%
Sales to Utilities	158	151	171	176	187	200	1.4%
Generation for Own Use	158	156	181	199	213	227	1.9%
Net Imports[8]	27	32	52	29	21	21	-2.0%
Electricity Sales by Sector							
Residential	1128	1146	1316	1455	1573	1701	1.9%
Commercial	1088	1083	1274	1432	1559	1643	2.0%
Industrial	1040	1063	1144	1228	1309	1411	1.4%
Transportation	17	17	28	35	43	49	5.0%
Total	3253	3309	3761	4147	4484	4804	1.8%
End-Use Prices (1999 cents per kilowatthour)[9]							
Residential	8.3	8.1	7.5	7.5	7.5	7.6	-0.3%
Commercial	7.6	7.3	6.7	6.0	6.0	6.2	-0.8%
Industrial	4.6	4.5	4.2	3.8	3.8	4.0	-0.6%
Transportation	5.4	5.3	4.9	4.6	4.5	4.5	-0.8%
All Sectors Average	6.8	6.7	6.2	5.9	5.9	6.0	-0.5%
Prices by Service Category (1999 cents per kilowatthour)[9]							
Generation	4.3	4.1	3.5	3.2	3.2	3.4	-0.9%
Transmission	0.6	0.6	0.6	0.7	0.7	0.7	0.7%
Distribution	2.0	2.0	2.0	2.0	2.0	2.0	-0.0%
Emissions (million short tons)							
Sulfur Dioxide	13.13	12.46	10.30	9.28	9.33	8.95	-1.6%
Nitrogen Oxide	5.83	5.45	4.25	4.22	4.33	4.42	-1.0%

[1]Includes grid-connected generation at all utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.
[2]Includes electricity generation by fuel cells.
[3]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[4]Cogenerators produce electricity and other useful thermal energy. Includes sales to utilities and generation for own use.
[5]Other gaseous fuels include refinery and still gas.
[6]Other includes hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.
[7]Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.
[8]In 1999 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.
[9]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1998: Electric generators and cogenerators generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Electric Power Annual 1998, Volume 2*, DOE/EIA-0348(98)/2 (Washington, DC, December 1999), and supporting databases. Other generators: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility" and Department of Energy, Office of Energy Efficiency and Renewable Energy estimates. Commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 19* (Oak Ridge, TN, 1999 September 1999). Prices: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A. 1999 and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A.

Table A14. Natural Gas Prices, Margins, and Revenues
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Source Price							
Average Lower 48 Wellhead Price[1]	2.02	2.08	2.49	2.69	2.83	3.13	2.0%
Average Import Price	1.99	2.29	2.49	2.43	2.47	2.67	0.7%
Average[2]	2.01	2.11	2.49	2.64	2.76	3.05	1.8%
Delivered Prices							
Residential	6.92	6.69	6.81	6.70	6.61	6.73	0.0%
Commercial	5.62	5.49	5.45	5.55	5.65	5.86	0.3%
Industrial[3]	2.80	2.87	3.26	3.40	3.54	3.88	1.4%
Electric Generators[4]	2.46	2.59	2.94	3.08	3.30	3.88	1.6%
Transportation[5]	6.57	7.21	6.99	7.23	7.36	7.52	0.2%
Average[6]	4.13	4.16	4.35	4.38	4.39	4.62	0.5%
Transmission and Distribution Margins[7]							
Residential	4.91	4.58	4.32	4.07	3.85	3.68	-1.0%
Commercial	3.60	3.37	2.96	3.01	2.89	2.81	-0.9%
Industrial[3]	0.79	0.75	0.77	0.78	0.78	0.82	0.4%
Electric Generators[4]	0.44	0.48	0.44	0.45	0.54	0.81	1.2%
Transportation[5]	4.56	5.10	4.50	4.60	4.60	4.48	-0.6%
Average[6]	2.12	2.04	1.86	1.74	1.63	1.57	-1.2%
Transmission and Distribution Revenue (billion 1999 dollars)							
Residential	22.31	21.61	22.96	22.55	22.42	22.56	0.2%
Commercial	10.87	10.36	10.71	11.40	11.38	11.31	0.4%
Industrial[3]	6.60	6.00	6.75	7.12	7.61	8.32	1.6%
Electric Generators[4]	1.63	1.81	2.36	3.11	5.02	6.93	6.6%
Transportation[5]	0.05	0.06	0.25	0.42	0.58	0.69	11.0%
Total	41.45	39.86	43.04	44.59	47.61	49.82	1.1%

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1998 residential, commercial, and transportation delivered prices; average lower 48 wellhead price; and average import price: Energy Information Administration (EIA), *Natural Gas Annual 1998*, DOE/EIA-0131(98) (Washington, DC, October 1999). 1998 electric generators delivered price: Form FERC-423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 1998 and 1999 industrial delivered prices based on EIA, *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1998 values, other 1999 values, and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101800A.

Table B14. Natural Gas Prices, Margins, and Revenue
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	1999	Projections								
		2010			2015			2020		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Source Price										
Average Lower 48 Wellhead Price[1]	2.08	2.49	2.69	3.06	2.59	2.83	3.20	2.66	3.13	3.68
Average Import Price	2.29	2.33	2.43	2.53	2.35	2.47	2.58	2.44	2.67	2.89
Average[2]	2.11	2.46	2.64	2.98	2.54	2.78	3.09	2.62	3.05	3.55
Delivered Prices										
Residential	6.69	6.50	6.70	7.09	6.37	6.61	6.95	6.32	6.73	7.24
Commercial	5.49	5.45	5.65	6.03	5.41	5.65	6.00	5.42	5.86	6.38
Industrial[3]	2.87	3.20	3.40	3.78	3.29	3.54	3.91	3.38	3.86	4.43
Electric Generators[4]	2.69	2.90	3.08	3.45	3.05	3.30	3.67	3.17	3.66	4.17
Transportation[5]	7.21	6.95	7.23	7.74	6.99	7.36	7.84	6.96	7.52	8.17
Average[6]	4.16	4.21	4.38	4.72	4.17	4.39	4.72	4.19	4.62	5.14
Transmission & Distribution Margins[7]										
Residential	4.58	4.05	4.07	4.12	3.83	3.85	3.86	3.70	3.68	3.69
Commercial	3.37	2.99	3.01	3.05	2.86	2.89	2.91	2.80	2.81	2.84
Industrial[3]	0.75	0.74	0.76	0.80	0.74	0.78	0.82	0.76	0.82	0.88
Electric Generators[4]	0.48	0.44	0.45	0.47	0.50	0.54	0.59	0.55	0.61	0.62
Transportation[5]	5.10	4.49	4.60	4.76	4.45	4.60	4.75	4.34	4.48	4.62
Average[6]	2.04	1.75	1.74	1.74	1.63	1.63	1.63	1.57	1.57	1.60
Transmission & Distribution Revenue (billion 1999 dollars)										
Residential	21.61	22.21	22.55	22.88	21.83	22.42	22.78	22.03	22.58	22.93
Commercial	10.36	11.05	11.40	11.72	10.85	11.38	11.64	10.73	11.31	11.88
Industrial[3]	6.00	6.66	7.12	7.68	6.80	7.61	8.66	7.08	8.32	9.86
Electric Generators[4]	1.61	2.67	3.11	3.48	4.29	5.02	5.84	5.67	6.93	7.05
Transportation[5]	0.08	0.39	0.42	0.45	0.53	0.58	0.63	0.62	0.69	0.77
Total	39.86	43.18	44.59	46.40	44.31	47.01	49.76	46.13	49.82	52.48

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.
Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1999 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1999 values and projections: EIA, AEO2001 National Energy Modeling System runs LM2001.D101600A, AEO2001.D101600A, and HM2001.D101600A.

Report Contents

[Report# DOE/EIA-0383(2001)]
December 22, 2000
(Next Release: December, 2001)

Preface

Overview

Legislation & Regulations

Issues in Focus

Market Trends

Forecast Comparisons

Major Assumptions for the Forecasts

Summary of the AEO2001 Cases/ Scenarios
- Appendix Table G1

Model Results (Formats - PDF, ZIP)
- Appendix Tables
- Reference Case
- 1998 to 2020

Download

Forecast Comparisons

Economic Growth	World Oil Prices	Total Energy Consumption	Residential and Commercial Sectors	Industrial Sector
Transportation Sector	Electricity	Natural Gas	Petroleum	Coal

Three other organizations—Standard & Poor's DRI (DRI), the WEFA Group (WEFA), and the Gas Research Institute (GRI) [95]—also produce comprehensive energy projections with a time horizon similar to that of *AEO2001*. The most recent projections from those organizations (DRI, Spring/Summer 2000; WEFA, 1st Quarter 2000; GRI, January 2000), as well as other forecasts that concentrate on petroleum, natural gas, and international oil markets, are compared here with the *AEO2001* projections.

Economic Growth

Differences in long-run economic forecasts can be traced primarily to different views of the major supply-side determinants of growth in gross domestic product (GDP): labor force and productivity change (Table 19). In comparison with the *AEO2001* and DRI reference cases, the WEFA forecast shows the highest economic growth, including a higher growth rate for the labor force. The *AEO2001* long-run forecast of average annual economic growth from 1999 to 2020 in the reference case is 3.0 percent—0.9 percent higher than the *AEO2000* forecast.

Table 19. Forecasts of economic growth, 1999-2020

The June 26, 2000, mid-session review by the Office of Management and Budget projected real GDP growth of 3.1 percent per year between 1999 and 2010. *AEO2001* projects annual growth of 3.3 percent over the same period.

World Oil Prices

Comparisons with other oil price forecasts—including the International Energy Agency (IEA), Petroleum Economics Ltd. (PEL), Petroleum Industry Research Associates, Inc. (PIRA), Natural Resources Canada (NRCan), and Deutsche Banc Alex. Brown (DBAB)—are shown in Table 20 (IEA, 1998; PEL, February 2000; PIRA, October 2000; NRCan, April 1997; DBAB, June 2000). With the exception of IEA and PEL, the range between the *AEO2001* low and high world oil price cases spans the range of other published forecasts.

Table 20. Forecasts of world oil prices, 2000-2020

Total Energy Consumption

Report
- Entire AEO2001 (PDF)
- AEO2001 by Chapters (PDF)

Acronyms

Contacts

Feedback

Related Links

Assumptions to the AEO2001

Supplemental Data to the AEO2001 (Only available on the Web)
- Regional and more detailed AEO 2001 Reference Case Results
- 1998, 2000 to 2020

NEMS Conference

Forecast Homepage

EIA Homepage

The *AEO2001* forecast of end-use sector energy consumption over the next two decades shows far less volatility than has occurred historically. Between 1974 and 1984, volatile world oil markets dampened domestic oil consumption. Consumers switched to electricity-based technologies in the buildings sector, while in the transportation sector new car fuel efficiency nearly doubled. Natural gas use declined as a result of high prices and limitations on new gas hookups. Between 1984 and 1995, however, both petroleum and natural gas consumption rebounded, bolstered by plentiful supplies and declining real energy prices. As a consequence, new car fuel efficiency in 1995 was less than 2 miles per gallon higher than in 1984, and natural gas use (residential, commercial, and industrial) was almost 25 percent higher than it was in 1984.

Given potentially different assumptions about, for example, technological developments over the next 20 years, the forecasts from DRI, GRI, and WEFA have remarkable similarities with the *AEO2001* projections. Electricity is expected to remain the fastest growing source of delivered energy (Table 21), although its projected rate of growth is down sharply from historical rates in each of the forecasts, because many traditional uses of electricity (such as for air conditioning) approach saturation while average equipment efficiencies rise. Petroleum use and natural gas consumption are projected to grow at rates similar to those of recent years. For other fuels, future growth in consumption is expected to slow as a result of moderating economic growth, fuel switching, and increased end-use efficiency.

Table 21. Forecasts of average annual growth rates for energy consumption (percent)

Residential and Commercial Sectors

Growth rates for energy demand in the residential and commercial sectors are expected to decrease by more than 25 percent from the rates between 1984 and 1998, largely because of projected lower growth in population, housing starts, and commercial floorspace additions. Other contributing factors include increasing energy efficiency due to technical innovations and legislated standards; voluntary government efficiency programs; and reduced opportunities for additional market penetration of such end uses as air conditioning.

Differing views on the growth of new uses for energy contribute to variations among the forecasts. By fuel, electricity (excluding generation and transmission losses) remains the fastest growing energy source for both sectors across all forecasts (Table 22). All the forecasts project substantial growth in electricity use, with the *AEO2001*, DRI, and WEFA projections showing slower growth toward the end of the forecast. Natural gas use also is projected to grow but at lower rates, and projected petroleum use either is stable or continues to fall. GRI projects a more rapid decline in oil use, particularly for commercial space and water heating, than the other forecasts.

Table 22. Forecasts of average annual growth in residential and commercial energy demand (percent)

Industrial Sector

The projected growth rates for delivered energy consumption in the industrial sector range from 1.0 percent to 1.4 percent per year (Table 23). The *AEO2001* forecast is in the middle, at 1.2 percent. Generally, the projected growth rates are somewhat lower than the actual rates from 1984 to 1998. The decline is attributable to lower growth for GDP and manufacturing output. In addition, there has been a continuing shift in the industrial output mix toward less energy-intensive products.

The growth rates for different fuels in the industrial sector between 1984 and 1998 reflect a shift from petroleum products and coal to greater reliance on natural gas and electricity. In all the forecasts, natural gas use is expected to grow more slowly than in recent history, because much of the potential for fuel switching was realized during the 1980s. A key uncertainty in industrial coal forecasts is the environmental acceptability of coal as a boiler fuel.

Table 23. Forecasts of average annual growth in industrial energy demand (percent)

Transportation Sector

Overall fuel consumption in the transportation sector is expected to grow slightly more slowly than in the recent past in each of the forecasts (Table 24). All the forecasts anticipate continued rapid growth in air travel and considerably slower growth in light-duty vehicle travel. Demand for diesel fuel is expected to grow more slowly in all the forecasts than it has in the past.

GRI and WEFA project slower growth in gasoline demand as a result of slower growth in light-duty vehicle travel, and GRI projects more rapid efficiency improvements. GRI also projects the slowest growth in air travel of all the forecasts, leading to slower growth in jet fuel demand. For diesel fuel, however, GRI projects rapid growth in demand comparable to the *AEO2001* forecast, because it projects similar annual growth in freight travel.

Table 24. Forecasts of average annual growth in transportation energy demand (percent)

Electricity

Comparison across forecasts shows slight variation in projected electricity sales (Table 25). Sales projections for 2020 range from 1,485 billion kilowatthours (DRI) to 1,610 billion kilowatthours (WEFA) for the residential sector, as compared with the *AEO2001* reference case value of 1,701 billion kilowatthours. The forecasts for total electricity sales in 2020 range from 4,450 billion kilowatthours (DRI) to 4,503 billion kilowatthours (WEFA), compared with the *AEO2001* reference case value of 4,804 billion kilowatthours. All the projections for total electricity sales in 2020 fall below the range of the *AEO2001* low and high economic growth cases (4,516 and 5,135 billion kilowatthours, respectively). Different assumptions related to expected economic activity, coupled with diversity in the estimation of penetration rates for energy-efficient technologies, are the primary reasons for variation among the forecasts. All the forecasts compared here agree that stable fuel prices and slow growth in electricity demand relative to GDP growth will tend to keep the price of electricity stable—or declining in real terms—until 2020.

Table 25. Comparison of electricity forecasts (billion kilowatthours, except where noted)

Both the DRI and GRI forecasts assume that the electric power industry will be fully restructured, resulting in average electricity prices that approach long-run marginal costs. *AEO2001* also assumes that competitive pressures will grow and continue to push prices down until the later years of the projections. *AEO2001* also assumes that increased competition in the electric power industry will lead to lower operating and maintenance costs, lower general and administrative costs, early retirement of inefficient generating units, and other cost reductions. Further, in the DRI forecast, it is assumed that time-of-use electricity rates will cause some

flattening of electricity demand (lower peak period sales relative to average sales), resulting in better utilization of capacity and capital cost savings.

The distribution of sales among sectors affects the mix of capacity types needed to satisfy sectoral demand. Although the *AEO2001* mix of capacity among fuels is similar to those in the other forecasts, small differences in sectoral demands across the forecasts could lead to significant differences in the expected mix of capacity types. In general, recent growth in the residential sector, coupled with an oversupply of baseload capacity, results in a need for more peaking and intermediate capacity than baseload capacity. Consequently, generators are expected to plan for more combustion turbine and combined-cycle technology than coal, oil, or gas steam capacity.

Natural Gas

The differences among published forecasts of natural gas prices, production, consumption, and imports (Table 26) indicate the uncertainty of future market trends. Because the forecasts depend heavily on the underlying assumptions that shape them, the assumptions should be considered when different projections are compared. For instance, the forecast from GRI incorporates a cyclical price trend based on exploration and production cycles, which can be deceptive when isolated years are considered. In both 2015 and 2020, the forecast with the highest natural gas consumption is the *AEO2001* high economic growth forecast (33.36 and 36.09 trillion cubic feet, respectively); and the forecast with the lowest level is the DRI forecast (29.46 and 28.58 trillion cubic feet, respectively).

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

The National Petroleum Council (NPC) forecast shows the greatest expected growth in natural gas consumption between 1999 and 2015 in the residential and commercial sectors. The DRI forecast shows the lowest growth between 1999 and 2015 and also between 1999 and 2020. For residential consumption in 2015, the expected percentage increase over 1999 is 10 percentage points higher in the NPC forecast than in the DRI forecast; for commercial consumption the difference is 23 percentage points. The DRI forecast for commercial consumption is significantly lower than the other forecasts, due in part to definitional differences, and is even lower for 2020 than for 2015. Both the *AEO2001* reference and high economic growth forecasts for residential and commercial consumption exceed the other forecasts for 2020.

For industrial sector consumption of natural gas, the WEFA and DRI forecasts are not strictly comparable with the others because of differences in definitions. Among the remaining forecasts, the *AEO2001* reference, low economic growth, and high economic growth cases all project lower consumption in 2015 than do the GRI, AGA, and NPC reference cases. All the forecasts project the strongest growth in natural gas consumption for the electricity generation sector.

Domestic natural gas consumption is met by domestic production and imports. DRI projects the highest level of net imports, as well as the highest share of imports relative to total supply, in both 2015 and 2020. GRI's projection for 2015 is 1.7 trillion cubic feet lower than DRI's, corresponding to projected import shares of total supply at 12 percent and 19 percent, respectively. The forecasts available for 2020 are much more closely aligned. In general the projections for domestic production levels among the forecasts correspond to their projections for domestic consumption. GRI projects the highest production level in 2015, as well as relatively low import levels.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts			
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AG
2015							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**2.83**	**2.59**	**3.20**	**2.64**	**1.89**	**2.79**	**2**
Dry gas production[b]	**26.24**	**24.63**	**27.86**	**24.43**	**28.58**	**24.00**	**26**
Net imports	**5.50**	**5.35**	**5.62**	**5.35**	**4.01**	**5.70**	**4**
Consumption	**31.61**	**29.85**	**33.36**	**30.13**	**32.78**	**29.46**	**30**
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3
Industrial[c]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10
Electricity generators [f]	9.30	8.54	9.97	11.63[c]	8.72	9.25[g]	7
Other [h]	2.78	2.63	2.92	2.57	3.27	2.75	3
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6
Commercial [c]	5.65	5.41	6.00	6.16[d]	4.62	6.03	5
Industrial [c]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.(
Electricity generators [f]	3.30	3.05	3.67	3.12[c]	2.55	3.24	2
2020							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**3.13**	**2.66**	**3.68**	**2.72**	**NA**	**3.07**	
Dry gas production[b]	**29.04**	**26.74**	**30.38**	**25.72**	**NA**	**25.13**	
Net imports	**5.80**	**5.58**	**5.82**	**5.72**	**NA**	**6.00**	
Consumption	**34.73**	**32.22**	**36.09**	**31.82**	**NA**	**28.58**	
Residential	6.14	5.95	6.21	5.88	NA	5.84	
Commercial [c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	
Industrial [c]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	
Electricity generators [f]	11.34	10.23	11.29	12.72[c]	NA	9.89[g]	
Other [h]	3.06	2.85	3.20	2.71	NA	2.88	
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.73	6.32	7.24	7.44	NA	7.25	
Commercial [c]	5.86	5.42	6.38	6.25[d]	NA	6.26	
Industrial [c]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	
Electricity generators [f]	3.66	3.17	4.17	3.20[c]	NA	3.52	

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore values for an isolated year may be misleading.

[b]Does not include supplemental fuels.

[c]Includes gas consumed in cogeneration.

[d]Excludes gas used for cogenerators and other nonutility generation.

[e]Excludes cogenerators' energy attributed to generating electricity

[f]Includes independent power producers and excludes cogenerators.

[g]Includes portion of cogeneration attributed to electricity generation

[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.

[i]Includes balancing item.

[j]Does not include certain State and local taxes levied on customers.

[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).

[l]Volume-weighted average of "system" gas and "transportation" gas.

NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,(cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: **AEO2001:** AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). **WEFA:** Group, Natural Gas Outlook (2000). **GRI:** Gas Research Institute, GRI Baseline Projection of U.S. Energy Supp Demand, 2000 Edition (January 2000). **DRI:** Standard & Poor's DRI, U.S. Energy Outlook (Spring/Summer 200 American Gas Association, 1999 AGA-TERA Base Case (December 1999). **NPC:** National Petroleum Council, Meeting the Challenges of the Nation's Growing Natural Gas Demand (December 1999).

Back to Forecast Comparisons

Even with production levels closer to the mid-range, the NPC forecast projects the highest wellhead price in 2015. At the other extreme, GRI projects the lowest wellhead price and the highest production levels. By 2020 the wellhead price forecasts from WEFA and DRI fall within the range of the *AEO2001* low and high economic growth cases, but both the WEFA and DRI forecasts for domestic production are lower than that in the *AEO2001* low economic growth case. With one exception, all the forecasts for end-use prices follow the same ranking from highest to lowest as do the wellhead price forecasts for both 2015 and 2020.

For the residential and commercial sectors in 2015, WEFA projects the highest end-use margins relative to the wellhead. The lowest projections for residential (GRI) and commercial (AGA) margins are $1.10 and $1.02 per thousand cubic feet lower than WEFA's, respectively, a noticeable difference. The GRI forecast, projecting relatively low residential and commercial margins, projects the highest margin to electricity generators in 2015, at $0.23 above the lowest (AGA). AGA generally projects the lowest margins, but they do not include some State and local taxes. Because of definitional differences industrial prices are not as readily comparable, although on-system sale prices would generally be expected to be higher than an estimate of the average price to all industrial customers. With the exception of the *AEO2001* high economic growth case, margins to the industrial sector are expected to decline through 2015 in all the forecasts. The *AEO2001* and NPC forecasts project declines of less than 10 percent in the industrial margin from 1998 to 2015, whereas the projected decline in the GRI and AGA forecasts is over 20 percent.

Petroleum

Projected prices for crude oil in the *AEO2001* low and high oil price cases (Table 27) bound the 2010 and 2020 projections in five other petroleum forecasts: the *AEO2001* reference case, WEFA, GRI, DRI, and the Independent Petroleum Association of America (IPAA). Comparisons with GRI and IPAA forecasts, which do not extend to 2020, apply only to 2010. *AEO2001* shows the highest reference case price path of the five forecasts. The *AEO2001* reference case projection for the world oil price in 2010 is $2.89 per barrel above the WEFA projection, $3.20 above GRI, and $2.72 above DRI. In 2020, however, the *AEO2001* reference case projection is only $2.00 per barrel above the WEFA projection and $1.25 above the DRI projection.

Table 27. Comparison of petroleum forecasts (million barrels per day, except where noted)

Crude oil price forecasts are influenced by differing views of the projected composition of world oil production, such as the expansion of OPEC oil production and the timing of an expected recovery in East Europe/former Soviet Union oil production. Differences may also arise on the basis of different views of the strength of the U.S. economy and the timing and strength of economic recovery in southeast Asia.

All the forecasts except GRI project a significant decline in domestic oil production between 2000 and 2010, reflecting assumed declines in proved reserves. GRI projects a milder decline before 2005, followed by an upturn in production between 2005 and 2015. Both WEFA and DRI continue their downward production projections to 2020, at slower rates. *AEO2001* projects a sharper decline before 2010 than do the other four projections, resulting in a 2010 reference case projection for crude oil production that is at least 280,000 barrels per day below the other reference case forecasts.

The *AEO2001* reference case projects relatively little change in annual domestic oil production between 2010 and 2020, whereas the high world oil price case projects a slight recovery after 2010, leading to more production in 2020 than in 2010. As a result, projected production in 2020 in the *AEO2001* high oil price case is above the WEFA and DRI projections, whereas the *AEO2001* reference case projection is essentially the same as the WEFA projection. The *AEO2001* projections for production of natural gas liquids are within the range of the other forecasts. GRI projects the highest level of natural gas liquids production in 2010 at 2.69 million barrels per day and IPAA the lowest at 2.03 million barrels per day.

The three *AEO2001* cases, along with DRI and IPAA, project relatively high levels of petroleum consumption, mostly as a result of higher projections for gasoline consumption. WEFA and GRI project the lowest petroleum consumption in 2010 at around 21.5 million barrels per day. DRI projects the highest consumption in 2010, followed by IPAA, the *AEO2001* low oil price case, and the *AEO2001* reference case. DRI has the highest 2020 consumption projection, followed closely by the *AEO2001* low oil price case. The WEFA consumption projection is significantly lower than all other forecasts for 2020, mainly because WEFA expects lower consumption of transportation fuels. Despite a wide range of oil price assumptions, the three *AEO2001* cases show limited variation in their projections for gasoline consumption. The three *AEO2001* cases show significantly more distillate fuel consumption than do WEFA and DRI, mainly attributable to a higher projected rate of increase in freight travel.

The projections of net petroleum imports in the *AEO2001* low oil price case are well above those in the other forecasts, reflecting low production and high consumption projections. The projected percentage of petroleum consumption from imports, which is an indicator of the relative direction of production, net imports, and consumption, is also highest in the *AEO2001* low oil price case, followed by the DRI forecast. For 2010 the projected import share of consumption ranges from 52 percent (WEFA and IPAA) to 66 percent (*AEO2001* low oil price case). In 2020 all the forecasts show increased reliance on imports, with the highest projection being 70 percent in the *AEO2001* low oil price case. WEFA projects the lowest share of imports in 2020 at 56 percent, because it projects significantly lower petroleum consumption than in the other forecasts. WEFA actually projects lower import shares than were projected in its own forecast last year for both 2010 and 2020 and is the only forecast with lower projected import shares than last year.

Coal

The coal forecast by DRI is the most similar to the *AEO2001* coal forecasts; however, the coal forecasts by DRI, WEFA and GRI/Hill [96] all project lower production and overall consumption than does *AEO2001* (Table 28). The differences stem from differences in assumptions related to expected economic activity and sectoral growth in electricity demand and whether the forecast includes the effects of emissions limits proposed by the U.S. Environmental Protection Agency, which could force the retirement of many older coal plants. *AEO2001* represents the provisions of the State implementation plan (SIP) call for 19 States where NO_x caps were finalized but does not incorporate revised limits on emissions of particulate matter. The DRI forecast projects substantial gains in efficiency for coal-fired generators.

Table 28. Comparison of coal forecasts (million short tons, except where noted)

EIA projects growing domestic consumption over the forecast horizon in

combination with shrinking real coal prices. DRI expects some expansion of electricity and industrial sector coal consumption followed by declines beginning after 2010. Similarly, GRI/Hill predicts increases in coal consumption until 2013 followed by a decline. WEFA is the most pessimistic about coal consumption in the electricity generation and industrial sectors.

The differences among the forecasts for coal exports are significant. U.S. coal exports declined from 90 million tons in 1996 to 58 million tons in 1999, and net coal exports in 1999 (after adjustment for imports) were 49 million tons. EIA expects net exports to decline to 35 million tons in 2015 and remain approximately at that level through 2020. GRI/Hill projects an even more dramatic decline in net exports to 4 million tons in 2015 and 2 million tons in 2020, reflecting declining coal demands by importing countries and strong competition from other producers such as Australia, South Africa, and Colombia. The projections for a long-term decline in exports are based primarily on the inability of the U.S. mining industry to keep pace with strong price competition by other exporters and the loss of markets as Europe moves away from coal for environmental reasons. Both DRI and WEFA, however, project relative stability in U.S. net coal exports, at 57 million tons in 2015 and 55 million tons in 2020 (DRI) and 51 million tons in 2015 and 52 million tons in 2020 (WEFA).

The *AEO2001* and WEFA price forecasts for national average minemouth coal prices (all shown in 1999 dollars) are fairly close. The GRI/Hill minemouth price projections are somewhat lower than the other forecasts because they exclude exported and metallurgical coal in the calculation. (Exported and metallurgical coal tend to be more expensive.) In dollars per million Btu, WEFA's slightly lower projected prices at $0.62 in 2015 and $0.59 in 2020 indicate a slightly higher average Btu per ton conversion factor, which in turn indicates a higher proportion of bituminous (over subbituminous) coal in the WEFA forecast.

The coal forecasts reviewed provide a broad range of views, reflecting the great uncertainties facing the U.S. coal industry as it must simultaneously adapt to the financial pressures arising from increasing environmental restrictions on coal use (both here and in Europe), deregulation of the U.S. electricity generation industry, and increasing competition from the younger coal fields of international competitors. The uncertainties are, and will continue to be, passed on to U.S. coal producers in the form of demands for higher quality products at ever lower prices.

If you would like to received any information relating to any of our reports via e-mail, click on the link labeled "Projections ListServ" to Join by entering your e-mail address.

Page last modified on 06/29/2001 08:44:12

URL: http://www.eia.doe.gov/oiaf/aeo/forecast.html

Need Help Now?

Call the National Energy Information Center (NEIC)

(202) 586-8800 9AM - 5PM eastern time

Specialized Services from NEIC

If you are having technical problems with this site, please contact the EIA Webmaster at wmaster@eia.doe.gov

---

This document contains the following shortcuts:

3400.35. SITE O&M LABOR & MISC EQUIPME	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

3400.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	40250 LB	0	0	40,250	0	0	40,250	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	12000 LB	0	0	18,000	0	0	18,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	44400 LB	0	0	6,660	0	0	6,660	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	110000 LB	0	0	4,400	0	0	4,400	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	72000 LB	0	0	7,200	0	0	7,200	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	4000.00 LB	0	0	7,120	0	0	7,120	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	103,630	3,500	0	107,130	8927.50

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45. DISPOSALS								
3400.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	240.00 CY	0	0	0	9,600	0	9,600	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	360.00 TON	0	0	0	21,600	0	21,600	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	31,200	0	34,200	2850.00
3400.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	12000 LBS	0	0	0	6,240	0	6,240	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	6,240	0	6,240	520.00
3400.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	40250 LBS	0	0	0	18,515	0	18,515	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	18,515	0	18,515	1542.92
3400.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00
3400.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	6.00 EA	0	0	300	0	0	300	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	6.00 EA	0	0	0	3,000	0	3,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	300	3,000	0	12,900	1075.00
TOTAL DISPOSALS	12.00 MO	0	12,600	300	278,755	0	291,655	24304.58

John Spear
10/26/01 12:08 PM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Calculation of T&D costs

Harry, I think I copied you on the quote from Clean Harbors. If not let me know. This is a dressed up version of my calculations.

Jack

T&D calculations.xls

McCORMICK & BAXTER

10/25/01

CALCULATIONS OF T&D COSTS BASED ON QUOTE FROM CLEAN HARBORS
USED IN THE CD ESTIMATES

CARBON (GAC) DISPOSAL COSTS	QUOTED UNIT COSTS	VAPOR PH	LIQUID PHASE
Disposal (per pound)		0.350	0.290
Transportation			
Cost per load (say 30,000#/load	4,435.00		
Cost per pound		0.148	0.148
RO/RO Rental (say 30 days/load)	270.00		
Cost per pound		0.009	0.009
Liner	50.00		
Cost per pound		0.002	0.002
Haz Fee	1.92/ton	0.001	0.001
TOTALS		0.509	0.450
	Say for est.	0.520 per #	0.460

NAPL DISPOSAL COSTS		
Disposal 0.12/# at 8.5#/gal		1.020
Transportation		
Cost per load (5000 gal/load	4,620.00	
Cost per gallon		0.924
Loading/Unloading Demurrage Say 2 hours extra/loac	170.00	0.034
TOTALS		1.978
	Say for est.	1.980 per gal

John Spear
10/25/01 10:11 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Clean Harbors T&D Quote

Harry,
Here is the quote from Clean Harbors for your backup.
Jack
—— Forwarded by John Spear/Cranford/URSCorp on 10/25/2001 01:17 PM ——

rowlandd@cleanharbors.com (Rowland, Dave)
10/24/2001 06:14 PM

To: "'john_spear@urscorp.com"' <john_spear@urscorp.com>
cc:
Subject: Stockton project

John;

I hope this helps. Call me with any questions

<<URS- CA NJ.doc>>

Dave Rowland
Clean Harbors Environmental Services
800-462-4678 Ext 228

URS- CA NJ.doc

July 3, 2001

URS Corporation
12 Commerce Drive
Cranford, NJ 07016
Attn. Jack Spear

Re: Budgetary numbers- Creosote Liquids

Dear Jack

Thank you for the opportunity to provide this budgetary estimate for the transportation and disposal of Creosote contaminated liquids coming from your California site. Although this project is merely in the planning stages, the cost estimates below should assist in your planning efforts.

Similar to wastes generated at other remediation sites, Clean Harbors (CHES) is familiar with ceosote contamination and we are looking forward to further discussions pertinent to this project. As you move forward, please don't hesitate to contact me with any questions you may have.

As mentioned, Creosote contaminated waste is suitable for incineration at our RCRA/CERCLA approved incinerator in Kimball, NE. Because of its relative proximity to the site, and our ability to receive both liquids and solids via rail, Kimball offers significant advantages over other disposal sites.

In the past two years, our Kimball, NE fluidized- bed incinerator has undergone several improvements that have led to record breaking incineration levels. Since our initial purchase of the incinerator in 1995, CHES has enhanced the feed and processing capabilities, added shredders and permitted pad storage space, replaced refractory linings and has recently completed construction of our second of six permitted monofills. These improvements will enable CHES to continue to incinerate wastes well into the millenium.

The inherent design of a fluidized bed incinerator enables CHES to offer aggressive pricing to customers requiring incineration of bulk solids, sludges and liquids. Additionally, Kimball is the <u>only</u> incinerator in the United States that is capable of delisting the ash produced from the incineration process, virtually eliminating long-term liability associated with hazardous waste landfills.

Attached you will find transportation and disposal pricing based upon the general knowledge of contaminated material from previous projects.

Our fleet of transportation equipment, coupled with our selected subcontracted transportation companies enables Clean Harbors to transport a variety of hazardous wastes without offloading demurrage, often reducing demurrage costs with a streamlined coordination effort. For this project we can utilize 5,000 gallon vacuum trailers from our Kimball site or Thousand Oaks, CA location. Further, we may utilize local approved subcontractors for proper transportation of your waste.

As you move forward with the planning of this project please contact us with any planning or logistical questions you may have. We are eager to work with you and will be contacting you soon to follow up on this quotation. If you have any questions in the meantime, please contact us at the Denver office at 1-800-462-4678 Ext, 228.

Sincerely,

Dave Rowland

Senior Account Manager

URS Corporation **July 3, 2001**

I. DISPOSAL:

a. Creosote contaminated Liquids **$0.08-$0.16/lb/lb.**
Minimum charge applies per load

General Specifications

FB1K BULK LIQUID/ENERGETIC FOR KIMBALL
BTU 6,000 - 10,000/lb
Metals within normal feed rates
Halogen less than 5%
Sulfur less than 3%
No pesticides/level A requirements
Na/K/Mg/P each less than .5%
Ash less than 5%
Settleable solids less than 5%
Viscosity of #4 fuel oil or better
PRIMARY DISPOSAL METHOD: DESTRUCTION INCINERATION

b. Creosote Contaminated Carbon- Vapor Phase
$0.34- $0.36/lb-
Bulk Quantity

c. Creosote Contaminated Carbon- Liquid Phase
$0.26 - $0.32/lb
Bulk Quantity

General Specifications

FB5 SOLID FUEL NOT PROCESSABLE (DEBRIS)
Less than 10% metal pieces
All metal pieces less than 6 inches longest dimension
No metal fines
Less than 30% inorganic material
Less than 10% halogens
Less than 50 ppm PCB's, non-TSCA regulated
Less than 4% sulfur
Greater than 5000 BTU's/lb
No pesticides
Non-dispersible solids (e.g. cured resins, rags, filters)
PRIMARY DISPOSAL METHOD: FUELS BLENDING

II. TRANSPORTATION

From Stockton to Kimball

a.	**Liquids to Kimball**	$4,620.00 per load Loading time: 2hrs $85.00/hr thereafter
b.	**Rolloffs to Kimball**	$4,435.00/load
c.	**Spot Fee**	TBD
d.	**Roll-off Rental**	$9.00/Day
e.	**Roll-off Liner**	$50.00/each

NOTE- scheduling of roll-off wastes into Kimball is most efficient when performed in a drop and swap mode. CHES will provide an empty roll-off to each driver upon delivery of full box.

III. State Hazardous Fee: NE- $1.92/Ton

IV. Analysis:

Basic Waste Approval fee	$75.00- WAIVED UPON FIRST SHIPMENT (Specific analysis, if needed will be additional)

The aforementioned prices are based upon the following conditions & assumptions:

1. Estimate prices only for budgetary needs
2. This project will commence upon agreement of Terms and conditions and a purchase order.
3. CHES will negotiate a mutually agreeable delivery schedule upon award.
4. Materials subject to additional charges if they do not conform to the listed specifications.
5. All containers must be marked with a CHES profile number
6. Client will provide free and clear access to work area for equipment and manpower.
7. Due to recent escalating fuel costs, a temporary 3% OPEC fuel surcharge will be added to each invoice.

We are very proud of our excellent compliance record. When outside disposal services are necessary, CHES only ships to facilities that pass our annual compliance audit, in addition to any disposal restrictions the generator may have. Our fleet of trucks is inspected daily to assure you of safe and dependable transportation of your hazardous waste. In addition, each truck is fitted with a satellite tracking system that enables constant communication with our dispatch personnel.

Finally, we offer waste tracking for all of your wastes through our on-line tracking system. This service is offered on a monthly, quarterly or yearly basis or is available on our Web site at www.Clean Harbors.com. Pricing is firm for 30 days and terms are NET15 commencing the last day of work being performed at the job site listed on the invoice.

Should you have any questions or need additional information, please contact me at 1-800-462-4678 in our Denver Service Center. We sincerely appreciate this opportunity to quote on your waste disposal services.

Metals Feed Limits- ppm

Antimony (Sb)	**1,155**
Arsenic (As)	**75**
Barium (Ba)	**4,050**
Beryllium (Be)	**10**
Cadmium (Cd)	**100**
Chromium (Cr)	**1,000**
Lead (Pb)	**7,995**
Mercury (Hg)	**10.0**
Nickel (Ni)	**12,450**
Selenium (Se)	**255**
Silver (Ag)	**255**
Thallium (Tl)	**37.5**

NOTE:
Wastes must not qualify as Inorganic Metal Bearing Wastes, which EPA prohibits from incineration

Table 7-1
Estimates of GAC Consumption by Liquid Stream Treatment

Visalia data used for scaling				
Liquid pumping rate	400	gpm		
First 6 months average	23,333	lbs/month		
Second year average	16,667	lbs/month		
Third year average	8,333	lbs/month		
Pump-and treat usage	1,667	lbs/month		
McCormick-Baxter estimates	Scenario 1	Scenario 2	Scenario 3	
Pumping rate	475	575	700	gpm
Montly usage 1st yr	27,708	33,542	40,833	lbs/month
Montly usage 2nd yr	23,750	28,750	35,000	lbs/month
Montly usage 3rd yr	14,844	17,969	21,875	lbs/month
Montly usage 4th yr	9,896	11,979	14,583	lbs/month
Usage during cooldown yr 1	5,938	7,188	8,750	lbs/month
Usage during cooldown yr 2	3,958	4,792	5,833	lbs/month
Usage during cooldown yr 3	1,979	2,396	2,917	lbs/month
Estimated total, sacrificial	1,056,875	1,279,375	1,557,500	lbs
Changeout frequency, 10,000 lb primary vessels (times per year)				
Year 1	33	40	49	times
Year 2	29	35	42	times
Year 3	18	22	26	times
Year 4	12	14	18	times
Year 5	7	9	11	times
Year 6	5	6	7	times
Year 7	2	3	4	times
Estimated regeneration frequency (times per month)[1]				
Year 1	6	7	8	times
Year 2	5	6	7	times
Year 3	3	4	4	times
Year 4	2	2	3	times
Year 5	1.2	1.4	1.8	times
Year 6	0.8	1.0	1.2	times
Year 7	0.4	0.5	0.6	times
Estimated carbon usage using regeneration on-site[2]				
Year 1	33,250	40,250	49,000	lbs
Year 2	28,500	34,500	42,000	lbs
Year 3	17,813	21,563	26,250	lbs
Year 4	11,875	14,375	17,500	lbs
Year 5	7,125	8,625	10,500	lbs
Year 6	4,750	5,750	7,000	lbs
Year 7	2,375	2,875	3,500	lbs
Estimated total, regeneration on-site	105,688	127,938	155,750	lbs
1) Assumed that the vessels are regenerated when they are 50% loaded				
2) The carbon will be replaced after 20 regeneration cycles				

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.49. SAMPLING & ANALYSIS								
3400.49. 5. PERFORMANCE MONITORING								
3400.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3400.49.10. COMPLIANCE MONITORING								
3400.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3400.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0.00 0	0.00 0	0.00 0	140.00 7,700	0.00 0	140.00 7,700	140.00
M AIR AA PCP/Semivolatile Organics (82 70)	55.00 EA	0.00 0	0.00 0	0.00 0	155.00 8,525	0.00 0	155.00 8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00 0	0.00 0	0.00 0	40.00 2,200	0.00 0	40.00 2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00 0	0.00 0	0.00 0	950.00 52,250	0.00 0	950.00 52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00 0	0.00 0	4.00 40	0.00 0	0.00 0	4.00 40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00 0	0.00 0	99.00 2,772	0.00 0	0.00 0	99.00 2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00 0	0.00 0	5.02 141	0.00 0	0.00 0	5.02 141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3400.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00 0	0.00 0	950.00 4,750	0.00 0	0.00 0	950.00 4,750	950.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0.00 0	0.00 0	0.00 0	203.00 1,015	0.00 0	203.00 1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)	5.00 EA	0.00 0	0.00 0	0.00 0	225.00 1,125	0.00 0	225.00 1,125	225.00
M AIR AA TAL Metals (6010/7000s)	5.00 EA	0.00 0	0.00 0	0.00 0	40.00 200	0.00 0	40.00 200	40.00
USR AA TPH	5.00 EA	0.00 0	0.00 0	0.00 0	87.00 435	0.00 0	87.00 435	87.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00 0	0.00 0	4.00 8	0.00 0	0.00 0	4.00 8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00 0	0.00 0	5.02 20	0.00 0	0.00 0	5.02 20	5.02
USR AA TCLP (As, Cr, SVOC)	8.00 EA	0.00 0	0.00 0	0.00 0	740.00 5,920	0.00 0	740.00 5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3400.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH	14.00 EA	0.00 0	0.00 0	0.00 0	60.00 840	0.00 0	60.00 840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00 0	0.00 0	0.00 0	140.00 1,960	0.00 0	140.00 1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00 0	0.00 0	0.00 0	155.00 2,170	0.00 0	155.00 2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00 0	0.00 0	0.00 0	40.00 560	0.00 0	40.00 560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00 0	0.00 0	0.00 0	950.00 4,750	0.00 0	950.00 4,750	950.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3400.49.10.25. SAMPLING TECHNICIANS

3400.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3400.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91

Kathryn Carpenter
06/29/01 07:57 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP, Wendy LS Oresik/Seattle/URSCorp@URSCORP, John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: M&B CD Compliance Monitoring analytical unit costs

Good Morning,

Here is a spreadsheet with unit costs for soil/solid, NAPL, GW, and air/vapor samples. Let me know if I missed anything or you need more backup. One thing we need to figure out is how to monitor for ozone. Can this be done with an onsite monitor? The AirToxics lab does not do this test so I suspect it needs to be done in the field.

compliance monitoring analysis unit cost

Kathryn A. Carpenter, MS
Senior Environmental Chemist
URS Corporation
1501 4th Ave., Suite 1400
Seattle, WA 98101-1616
(206) 438-2053 (phone)
(206) 438-2699 (fax)

Analyte	Method	NAPL	Soil/Solids	GW	Air/Vapor
TOC	9060			$55	
TPH	TPH-Dx	$87	$70	$60	
PAHs *	8310	$203	$161	$140	$220
PCP *	8270 mod	$225	$180	$155	$200
Metals (As, Cu, Cr, Zn)	6000/7000		$45	$40	
TCLP (metals, VOC, SVOC)	TCLP		$740		
Dioxin/Furans	8290			$950	
Natural Attenuation Parameters (dissolved methane, ethane, ethene)	RSK 175			$75	
TO13 (SVOC compounds)	TO13				$275
Carbon dioxide	ASTM D-1946				$115
Carbon monoxide	ASTM D-1946				incl.
Sulfur oxides	ASTM D-1946				$150
NO2	ASTM D-1946				incl.
O3	TBD				TBD
VOC	ASTM D-1946				$220
PM10	PM10				$35

References:
Unit costs for NAPL, soil/solids, and GW from URS Cost Estimating Database (June 2001)
Unit costs for air/vapor from AirToxics
* PCP and PAHs for air/vapor included in TO13 - this price is for reporting PCP or PAHs only

Table 6-1
Overview of Sampling Frequency for Subsurface ERT and Temperature Monitoring

	General Site Coverage		Vertical Plane South of Slough		Horizontal Plane Under Slough	New P&T Extraction Wells	New P&T Monitoring Wells
Phase	**ERT**	**DTS**	**ERT**	**DTS**	**ERT**	**DTS**	**DTS**
Heat-up	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily
Flushing/cycling	Monthly	Weekly	Monthly	Weekly	Daily	Weekly	Weekly
Cool-down	Quarterly	Monthly	Quarterly	Monthly	Weekly	Monthly	Monthly
Long-term monitoring	NA	NA	NA	NA	NA	NA	Quarterly

Table 6-2
National Ambient Air Quality Standards

Constituent	Standard Value ($\mu g/m^3$)	Standard Type
CO		
1- Hour average	40 mg/m^3	Primary
8-Hour average	10 mg/m^3	Primary
NO_2		
Annual arithmetic mean	100	Primary and secondary
O_3		
1-Hour average	235	Primary and secondary
8-Hour average	157	Primary and secondary
Pb		
Quarterly average	1.5	Primary and secondary
PM_{10}		
Annual arithmetic mean	50	Primary and secondary
24-Hour average	150	Primary and secondary
SO_2		
Annual arithmetic mean	80	Primary
24-Hour average	365	Primary and secondary
3-Hour average	1,300	Primary and secondary

Note: Units in microgram per cubic meter of air, unless otherwise noted.

Table 6-3
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring—Steam Phase					
ERT data	Subsurface	Temperature	Daily/weekly/ monthly (see Table 6-1)	41 to 63 vertical 4 horizontal	NA
Electrical	System	Amps and power	Weekly	59 ERH electrodes	NA
Temperature/DTS distribution	Wellhead	Temperature	Daily/weekly (see Table 6-1)	301 to 416 wells	NA
Steam distribution	Wellhead	Liquid flow	Continuous	169 to 249	NA
	Wellhead, boiler plant, treatment plant	Pressure	Continuous	200 to 300	NA
Contaminant removal rate	NAPL (at wellhead)	Volume	Weekly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Weekly	4 to 6	NA
		TOC	Weekly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Well installation soil borings[b]	Soil	Visual	Initial	20	20
		TPH	Confirmation	20	20
		PAHs	Confirmation	20	20
		PCP	Confirmation	20	20
Interim drill-back soil borings	Soil	TPH	Annual[c]	50[d]	50[d]
		PAHs	Annual[c]	50[d]	50[d]
		PCP	Annual[c]	50[d]	50[d]
Groundwater monitoring[b]	Water	TOC	Initial	60	60
		PAHs	Initial	60	60
		PCP	Initial	60	60
		Metals[e]	Initial	60	60
		Dioxins/furans	Initial	10	10
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Cool Down Phase					
Temperature/DTS distribution	Subsurface	Temperature	Monthly (see Table 6-1)	301 to 416 wells	NA
Contaminant removal rate	NAPL (at well-head)	Volume	Monthly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Monthly	4 to 6	NA
		TOC	Monthly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year
Performance Monitoring - Cool Down Phase (Continued)					
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Confirmatory Monitoring - Steam Phase					
Boiler air emissions/ stack monitoring	Gas	VOCs	Initial	1	4[f]
		SVOCs[g]	Initial	1	4[f]
		Dioxins/furans	Initial	1	4[f]
		Metals[h]	Initial	1	4[f]
		PM	Initial	1	4[f]
		HCl	Initial	1	4[f]
		Cl_2	Initial	1	4[f]
		Total hydrocarbons	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
		Opacity	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Monthly	3	36
		PCP	Monthly	3	36
		PM_{10}	Monthly	3	36
		Metals	Monthly	3	36
		CO	CEMS	3	NA
		SO_x	CEMS	3	NA
		NO_2	CEMS	3	NA
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Quarterly	1	4
		PAHs	Quarterly	1	4
		PCP	Quarterly	1	4
		Metals[e]	Quarterly	1	4
		Dioxins/furans	Quarterly	1	4
	Solids (well)	TCLP[i]	Quarterly	1	4
	Solids (SAC)	TCLP[i]	Quarterly	1	4
	Solids (sludge)	TCLP[i]	Quarterly	1	4
	Solids (spent filter media)	TCLP[i]	Quarterly	1	4
Perimeter groundwater monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year
Cleanup Phase					
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Annually	1	1
		PAHs	Annually	1	1
		PCP	Annually	1	1
		Metals[e]	Annually	1	1
		Dioxins/furans	Annually	1	1
	Solids (well)	TCLP[i]	Annually	1	1
	Solids (SAC)	TCLP[i]	Annually	1	1
	Solids (sludge)	TCLP[i]	Annually	1	1
	Solids (spent filter media)	TCLP[i]	Annually	1	1
Perimeter groundwater monitoring	Water	TPH	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Confirmational Sampling					
Soil borings	Soil	LIF survey	Final	4 weeks	4 weeks
		NAPL mobility leach test[j]	Final	10	10
		TPH	Final	10	10
		PAHs	Final	10	10
		PCP	Final	10	10
Long-Term Monitoring (30 years)					
Groundwater monitoring (perimeter and treatment zones)	Water	PAHs	Annually	25	25
		PCP	Annually	25	25

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

[a]Total number of samples does not include QA samples. QA samples are 10% per batch.
[b]Includes baseline sampling and analysis during system (e.g., wells) installation.
[c]Will be conducted for years 2, 3, and 4 (i.e., 3 times over the course of the steam treatment period).
[d]Assumes 5 samples from each of 10 borings.
[e]Metals include As, Cr, Cu, and Zn.
[f]Includes 3 samples taken from 1 boiler stack and 1 blank.
[g]SVOCs include PAHs and PCP.
[h]40 CFR 266.106 provides standards to control metals emissions. Subpart I regulated metals include Ag, As, Ba, Be, Cd, Cr, Hg, Pb, Sb, and Th. Of these metals, As and Cr are of concern at the site.
[i]Leachate from TCLP analyzed for As, Cr, and SVOCs
[j]NAPL Mobility Product Leaching Study, methodology leach test to be determined.

Notes:
Performance monitoring: Monitor system performance during remediation. Includes steam phase and cool-down period.
Compliance monitoring: Monitor compliance with disposal/discharge requirements. Includes steam phase and cool down period.
Confirmational sampling: To confirm "long-term effectiveness" of the remediation performed.

Ag: silver
As: arsenic
Ba: barium
Be: beryllium
CEMS: continuous emissions monitoring system
Cd: cadmium
CO: carbon monoxide
CO_2: carbon dioxide
COCs: chemicals of concern (PAHs, PCP, dioxins/furans, As, Cr, Cu, and Zn)
Cl_2: chlorine gas
Cr: chromium
Cu: copper
HCl: hydrogen chloride
Hg: mercury
LIF: laser-induced fluorescence
NO_x: nitrogen oxides
O_3: ozone
PAHs: polynuclear aromatic hydrocarbons
Pb: lead
PCP: pentachlorophenol
PM: particulate matter
SAC: spent activated carbon
Sb: antimony
SO_x: sulfur oxides
SVOCs: semivolatile organic compounds
TAPs: toxic air pollutants
TCLP: toxicity characteristics leaching procedure
Th: thallium
TOC: total organic carbon
TPH: total petroleum hydrocarbons
VOCs: volatile organic compounds
Zn: zinc

Table 6-5
Perimeter Monitoring Wells to Be Sampled

Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
1	7	6	6	3	3
2	7	6	4	3	3
3	7	6	4	3	3

Table 6-6
Perimeter Monitoring Frequency

Years[1]	Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
0-7	1	Semi-annually				
	2					
	3					
7-30	1	Annually	Annually	Annually	5-years	5-years
	2	Annually	Annually	Annually	5-years	5-years
	3	Annually	Annually	Annually	5-years	5-years

[1]Years are from start of thermal remediation.

3400.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.55. QC & ANALYTICAL DATA VALIDATION									
3400.55. 5. DATA VALIDATION									
3400.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3400.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3400.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
3400.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 1ST YEAR O&M	12.00	MO	1,089,932	64,060	174,980	977,569	7,599,145	9,905,686	825473.84

3405. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405. 2ND YEAR O&M									
3405. 5. GENERAL CONDITIONS									
3405. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

3405. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3405. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3405. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3405.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3405.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3405.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3405.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3405.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	1668571	MBT	0	0	0	0	5,839,999	5,839,999	3.50
@ $3.50									
USR AA Electricity for Electrodes			0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	32237	KKW	0	0	0	0	1,934,220	1,934,220	60.00
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	32237	KKW	0	0	0	0	-1934220	-1,934,220	-60.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	12264	KKW	0	0	0	0	735,840	735,840	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	140160	UNT	0	0	0	0	112,128	112,128	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	6,695,143	6,695,143	557928.54

3405.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3405.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	34500 LB	0	0	34,500	0	0	34,500	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	12000 LB	0	0	18,000	0	0	18,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	44400 LB	0	0	6,660	0	0	6,660	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	110000 LB	0	0	4,400	0	0	4,400	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	72000 LB	0	0	7,200	0	0	7,200	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3600.00 LB	0	0	6,408	0	0	6,408	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
TOTAL CHEMICALS	12.00 MO	0	0	96,368	3,500	0	99,868	8322.33

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45. DISPOSALS								
3405.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	240.00 CY	0	0	0	9,600	0	9,600	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	360.00 TON	0	0	0	21,600	0	21,600	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	31,200	0	34,200	2850.00
3405.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	12000 LBS	0	0	0	6,240	0	6,240	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	6,240	0	6,240	520.00
3405.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	34500 LBS	0	0	0	15,870	0	15,870	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	15,870	0	15,870	1322.50
3405.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00
3405.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	6.00 EA	0	0	300	0	0	300	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	6.00 EA	0	0	0	3,000	0	3,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	300	3,000	0	16,260	1355.00
TOTAL DISPOSALS	12.00 MO	0	15,960	300	276,110	0	292,370	24364.17

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.49. SAMPLING & ANALYSIS								
3405.49. 5. PERFORMANCE MONITORING								
3405.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3405.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3405.49.10. COMPLIANCE MONITORING								
3405.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3405.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3405.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3405.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35
3405.49.10.25. SAMPLING TECHNICIANS								
3405.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3405.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3405.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3405.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.55. QC & ANALYTICAL DATA VALIDATION									
3405.55. 5. DATA VALIDATION									
3405.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3405.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3405.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
3405.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50

3405.60. DEMOBE/DEMO SPH 6PH COMPONENT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.60. DEMOBE/DEMO SPH 6PH COMPONENTS									
USR AA Remove/Salvage SPT 6ph			0.00	0.00	0.00	37452.00	0.00	37452.00	
Aboveground Components	1.00	LS	0	0	0	37,452	0	37,452	37452.00
TOTAL DEMOBE/DEMO SPH 6PH COMPONENT	1.00	JOB	0	0	0	37,452	0	37,452	37452.00
TOTAL 2ND YEAR O&M	12.00	MO	1,093,804	67,420	157,718	1,088,632	6,710,217	9,117,791	759815.92

3410. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410. 3RD YEAR O&M									
3410. 5. GENERAL CONDITIONS									
3410. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

3410. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3410. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3410.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3410.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3410.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3410.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3410.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	1430208	MBT	0	0	0	0	5,005,728	5,005,728	3.50
@ $3.50									
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	8760.00	KKW	0	0	0	0	-525,600	-525,600	-60.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	8760.00	KKW	0	0	0	0	525,600	525,600	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	105120	UNT	0	0	0	0	84,096	84,096	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	5,097,000	5,097,000	424750.00

3410.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3410.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	21563 LB	0	0	21,563	0	0	21,563	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	12000 LB	0	0	18,000	0	0	18,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	44400 LB	0	0	6,660	0	0	6,660	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	110000 LB	0	0	4,400	0	0	4,400	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	72000 LB	0	0	7,200	0	0	7,200	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3600.00 LB	0	0	6,408	0	0	6,408	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
TOTAL CHEMICALS	12.00 MO	0	0	83,431	3,500	0	86,931	7244.25

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45. DISPOSALS								
3410.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	240.00 CY	0	0	0	9,600	0	9,600	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	360.00 TON	0	0	0	21,600	0	21,600	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	31,200	0	34,200	2850.00
3410.45.10. CARBON (GAC, VAPOR PHASE)								
Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	12000 LBS	0	0	0	6,240	0	6,240	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	6,240	0	6,240	520.00
3410.45.15. CARBON (GAC, LIQUID PHASE)								
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	21563 LBS	0	0	0	9,919	0	9,919	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	9,919	0	9,919	826.58
3410.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00
3410.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	6.00 EA	0	0	300	0	0	300	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	6.00 EA	0	0	0	3,000	0	3,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	300	3,000	0	16,260	1355.00
TOTAL DISPOSALS	12.00 MO	0	15,960	300	270,159	0	286,419	23868.25

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.49. SAMPLING & ANALYSIS								
3410.49. 5. PERFORMANCE MONITORING								
3410.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3410.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3410.49.10. COMPLIANCE MONITORING								
3410.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3410.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	55.00 EA	0	0	0	7,700	0	7,700	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3410.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3410.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3410.49.10.25. SAMPLING TECHNICIANS

3410.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3410.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3410.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3410.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.55. QC & ANALYTICAL DATA VALIDATION								
3410.55. 5. DATA VALIDATION								
3410.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3410.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3410.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3410.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 3RD YEAR O&M	12.00 MO	1,093,804	67,420	144,781	698,805	5,112,074	7,116,885	593073.71

3415. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415. 4TH YEAR O&M									
3415. 5. GENERAL CONDITIONS									
3415. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

3415. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3415. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3415.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3415.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3415.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3415.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3415.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB			0.00	0.00	0.00	0.00	3.50	3.50	
TU	1191836	MBT	0	0	0	0	4,171,426	4,171,426	3.50
@ $3.50									
USR AA Electircity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	8760.00	KKW	0	0	0	0	525,600	525,600	60.00
Plant, Steam: $60 per K KWH									
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	8760.00	KKW	0	0	0	0	-525,600	-525,600	-60.00
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	105120	UNT	0	0	0	0	84,096	84,096	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	4,262,698	4,262,698	355224.83

3415.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3415.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	14375 LB	0	0	14,375	0	0	14,375	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	6000.00 LB	0	0	9,000	0	0	9,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	44400 LB	0	0	6,660	0	0	6,660	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	110000 LB	0	0	4,400	0	0	4,400	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	72000 LB	0	0	7,200	0	0	7,200	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3600.00 LB	0	0	6,408	0	0	6,408	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
TOTAL CHEMICALS	12.00 MO	0	0	67,243	3,500	0	70,743	5895.25

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45. DISPOSALS								
3415.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3415.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	6000.00 LBS	0	0	0	3,120	0	3,120	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	3,120	0	3,120	260.00
3415.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	14375 LBS	0	0	0	6,613	0	6,613	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	6,613	0	6,613	551.04
3415.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00
3415.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	6.00 EA	0	0	300	0	0	300	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	6.00 EA	0	0	0	3,000	0	3,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	300	3,000	0	16,260	1355.00
TOTAL DISPOSALS	12.00 MO	0	15,960	300	258,533	0	274,793	22899.38

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.49. SAMPLING & ANALYSIS								
3415.49. 5. PERFORMANCE MONITORING								
3415.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3415.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3415.49.10. COMPLIANCE MONITORING								
3415.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3415.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00 0	0.00 0	0.00 0	140.00 7,700	0.00 0	140.00 7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00 0	0.00 0	0.00 0	155.00 8,525	0.00 0	155.00 8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00 0	0.00 0	0.00 0	40.00 2,200	0.00 0	40.00 2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00 0	0.00 0	0.00 0	950.00 52,250	0.00 0	950.00 52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00 0	0.00 0	4.00 40	0.00 0	0.00 0	4.00 40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00 0	0.00 0	99.00 2,772	0.00 0	0.00 0	99.00 2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00 0	0.00 0	5.02 141	0.00 0	0.00 0	5.02 141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3415.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00 0	0.00 0	950.00 4,750	0.00 0	0.00 0	950.00 4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0.00 0	0.00 0	0.00 0	203.00 1,015	0.00 0	203.00 1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)	5.00 EA	0.00 0	0.00 0	0.00 0	225.00 1,125	0.00 0	225.00 1,125	225.00
M AIR AA TAL Metals (6010/7000s)	5.00 EA	0.00 0	0.00 0	0.00 0	40.00 200	0.00 0	40.00 200	40.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)	8.00 EA	0.00	0.00	0.00	740.00	0.00	740.00	
		0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3415.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH	14.00 EA	0.00	0.00	0.00	60.00	0.00	60.00	
		0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35
3415.49.10.25. SAMPLING TECHNICIANS								
3415.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3415.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3415.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3415.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.55. QC & ANALYTICAL DATA VALIDATION								
3415.55. 5. DATA VALIDATION								
3415.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3415.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3415.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3415.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50

3415.60. REMOVE/DEMO STEAM EQUIPMENT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.60. REMOVE/DEMO STEAM EQUIPMENT									
3415.60. 5. DEMOLITION/REMOVAL EQUIPMENT									
MIL AA Outside Equip. Operators, Med			56.51	0.00	0.00	0.00	0.00	56.51	
ium	80.00	HR	4,520	0	0	0	0	4,520	56.51
MIL AA Outside Laborers, (Semi-Skill			38.39	0.00	0.00	0.00	0.00	38.39	
ed)	320.00	HR	12,285	0	0	0	0	12,285	38.39
MIL AA Outside Plumbers			50.69	0.00	0.00	0.00	0.00	50.69	
	80.00	HR	4,055	0	0	0	0	4,055	50.69
MIL AA CRANE,HYD,TRK MTD, 4.5T/52'B			0.00	4.37	0.00	0.00	0.00	4.37	
OOM	80.00	HR	0	350	0	0	0	350	4.37
(ADD FLAT BED 43,000GVW TRUCK)									
TOTAL DEMOLITION/REMOVAL EQUIPMENT	1.00	JOB	20,860	350	0	0	0	21,210	21210.15
3415.60.10. DISPOSALS									
USR AA Disposal Misc Piping &			0.00	0.00	0.00	100.00	0.00	100.00	
Equipment, RCRA Landfill	100.00	TON	0	0	0	10,000	0	10,000	100.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	20,860	350	0	10,000	0	31,210	2600.85
TOTAL 4TH YEAR O&M	12.00	MO	1,114,665	67,770	128,593	697,179	4,277,772	6,285,978	523831.52

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420. 5TH YEAR O&M								
3420. 5. GENERAL CONDITIONS								
3420. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3420. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3420.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3420.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3420.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3420.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3420.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	60.00	60.00	
ent	5694.00	KKW	0	0	0	0	341,640	341,640	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	10512	UNT	0	0	0	0	8,410	8,410	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	357,226	357,226	29768.80

3420.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3420.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	8625.00 LB	0	0	8,625	0	0	8,625	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	44400 LB	0	0	6,660	0	0	6,660	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	110000 LB	0	0	4,400	0	0	4,400	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	72000 LB	0	0	7,200	0	0	7,200	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3600.00 LB	0	0	6,408	0	0	6,408	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4800.00 LB	0	0	9,600	0	0	9,600	2.00
TOTAL CHEMICALS	12.00 MO	0	0	52,493	3,500	0	55,993	4666.08

3420.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.45. DISPOSALS								
3420.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	240.00 CY	0	0	0	9,600	0	9,600	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	360.00 TON	0	0	0	21,600	0	21,600	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	31,200	0	34,200	2850.00
3420.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	8625.00 LBS	0	0	0	3,968	0	3,968	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,968	0	3,968	330.63
3420.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3420.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00

3420.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.45.30. WASTE MISC COSTS									
USR AA RO/RO Rental			0.00	270.00	0.00	0.00	0.00	270.00	
	48.00	MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners			0.00	0.00	50.00	0.00	0.00	50.00	
	5.00	EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	257,468	0	273,678	22806.46

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49. SAMPLING & ANALYSIS								
3420.49. 5. PERFORMANCE MONITORING								
3420.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3420.49.10. COMPLIANCE MONITORING								
3420.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Al low		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 108 Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3420.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3420.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3420.49.10.25. SAMPLING TECHNICIANS

3420.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3420.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3420.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3420.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.55. QC & ANALYTICAL DATA VALIDATION									
3420.55. 5. DATA VALIDATION									
3420.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3420.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3420.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 5TH YEAR O&M	12.00	MO	1,081,022	67,420	109,043	612,183	370,890	2,240,558	186713.14

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425. 6TH YEAR O&M								
3425. 5. GENERAL CONDITIONS								
3425. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3425. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3425.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3425.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3425.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3425.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3425.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment Plant: $60 per K KWH			0.00	0.00	0.00	0.00	60.00	60.00	
	5694.00	KKW	0	0	0	0	341,640	341,640	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit			0.00	0.00	0.00	0.00	0.80	0.80	
	10512	UNT	0	0	0	0	8,410	8,410	0.80
USR AA Water Meter Service Charge: 198.00/mon			0.00	0.00	0.00	0.00	198.00	198.00	
	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	357,226	357,226	29768.80

3425.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3425.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	5750.00 LB	0	0	5,750	0	0	5,750	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	42,320	2,500	0	44,820	3735.00

3425.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.45. DISPOSALS								
3425.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3425.45.15. CARBON (GAC, LIQUID PHASE)								
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	5750.00 LBS	0	0	0	2,645	0	2,645	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	2,645	0	2,645	220.42
3425.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3425.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00

3425.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.45.30. WASTE MISC COSTS									
USR AA RO/RO Rental			0.00	270.00	0.00	0.00	0.00	270.00	
	48.00	MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners			0.00	0.00	50.00	0.00	0.00	50.00	
	5.00	EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	250,945	0	267,155	22262.92

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49. SAMPLING & ANALYSIS								
3425.49. 5. PERFORMANCE MONITORING								
3425.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3425.49.10. COMPLIANCE MONITORING								
3425.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 100 Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3425.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3425.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3425.49.10.25. SAMPLING TECHNICIANS

3425.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3425.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3425.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.55. QC & ANALYTICAL DATA VALIDATION									
3425.55. 5. DATA VALIDATION									
3425.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3425.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3425.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 6TH YEAR O&M	12.00	MO	1,081,022	67,420	98,870	604,660	370,890	2,222,862	185238.51

3430. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430. 7TH YEAR O&M								
3430. 5. GENERAL CONDITIONS								
3430. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3430. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3430. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3430.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3430.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3430.20. MATERIALS & SUPPLIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.20. MATERIALS & SUPPLIES									
USR AA Office Supplies			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies			0.00	0.00	100.00	0.00	0.00	100.00	
	12.00	MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00

3430.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3430.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment Plant, Steam: $60 per K KWH			0.00	0.00	0.00	0.00	60.00	60.00	
	5694.00	KKW	0	0	0	0	341,640	341,640	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit			0.00	0.00	0.00	0.00	0.80	0.80	
	10512	UNT	0	0	0	0	8,410	8,410	0.80
USR AA Water Meter Service Charge: 198.00/mon			0.00	0.00	0.00	0.00	198.00	198.00	
	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	357,226	357,226	29768.80

3430.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3430.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	2875.00 LB	0	0	2,875	0	0	2,875	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	37000 LB	0	0	5,550	0	0	5,550	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	92000 LB	0	0	3,680	0	0	3,680	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	60000 LB	0	0	6,000	0	0	6,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	3000.00 LB	0	0	5,340	0	0	5,340	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	4000.00 LB	0	0	8,000	0	0	8,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	39,445	2,500	0	41,945	3495.42

3430.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.45. DISPOSALS								
3430.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3430.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	2875.00 LBS	0	0	0	1,323	0	1,323	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	1,323	0	1,323	110.21
3430.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3430.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 770,000gallons of NAPL's assumed removed for Scenario 2.								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	110000 GAL	0	0	0	217,800	0	217,800	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	217,800	0	217,800	18150.00

3430.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.45.30. WASTE MISC COSTS									
USR AA RO/RO Rental			0.00	270.00	0.00	0.00	0.00	270.00	
	48.00	MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners			0.00	0.00	50.00	0.00	0.00	50.00	
	5.00	EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	249,623	0	265,833	22152.71

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49. SAMPLING & ANALYSIS								
3430.49. 5. PERFORMANCE MONITORING								
3430.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3430.49.10. COMPLIANCE MONITORING								
3430.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3430.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3430.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3430.49.10.25. SAMPLING TECHNICIANS

3430.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3430.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
3430.49.15. CONFIRMATIONAL SAMPLING								
3430.49.15.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA NAPL Mobility		0.00	0.00	0.00	200.00	0.00	200.00	
	11.00 EA	0	0	0	2,200	0	2,200	200.00
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	11.00 EA	0	0	0	957	0	957	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	11.00 EA	0	0	0	1,771	0	1,771	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	11.00 EA	0	0	0	1,980	0	1,980	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car office.		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	5.00 DAY	0	0	0	0	990	990	198.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	60,908	1,410	66,190	6619.00
3430.49.15.15. LIF SURVEY								
USR AA LIF Survey/Report		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL LIF SURVEY		0	0	0	5,000	0	5,000	
TOTAL CONFIRMATIONAL SAMPLING		3,872	0	0	65,908	1,410	71,190	
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	21,640	184,043	10,316	278,980	23248.33

3430.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.55. QC & ANALYTICAL DATA VALIDATION									
3430.55. 5. DATA VALIDATION									
3430.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3430.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3430.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60. DEMO/REMOVAL TREATMENT SYSTEM									
3430.60.02. GENERAL CONDITIONS									
3430.60.02.01. FIELD SUPERVISION & MANAGEMENT									
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.									
USR AA Prin. Engineer/Scientist I,			66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	200.00	HR	13,363	0	0	0	0	13,363	66.82
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	1000.00	HR	53,130	0	0	0	0	53,130	53.13
USR AA Secretary/Clerical II			19.32	0.00	0.00	0.00	0.00	19.32	
	1000.00	HR	19,320	0	0	0	0	19,320	19.32
USR AA Health & Safety Officer (HSO)			37.03	0.00	0.00	0.00	0.00	37.03	
	1000.00	HR	37,030	0	0	0	0	37,030	37.03
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P			0.00	5.50	0.00	0.00	0.00	5.50	
KUP	2000.00	HR	0	11,000	0	0	0	11,000	5.50
REF. EP 1110-1-8 4X2 3/4-TON									
USR AA Lodging;			0.00	0.00	0.00	0.00	1000.00	1000.00	
	6.00	MO	0	0	0	0	6,000	6,000	1000.00
USR AA M&IE			0.00	0.00	0.00	0.00	28.50	28.50	
	260.00	DAY	0	0	0	0	7,410	7,410	28.50
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	12.00	EA	0	0	0	0	6,000	6,000	500.00
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	12.00	EA	0	0	0	0	240	240	20.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	10000	MI	0	0	0	0	3,500	3,500	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	122,843	11,000	0	0	23,150	156,993	156993.00
3430.60.02.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	40.00	HR	4,136	0	0	0	0	4,136	103.40

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Prin. Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	400.00 HR	15,400	0	0	0	0	15,400	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	520.00 HR	30,888	0	0	0	0	30,888	59.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	40.00 HR	4,136	0	0	0	0	4,136	103.40
Health and Safety Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	40.00 HR	4,136	0	0	0	0	4,136	103.40
gr								
USR AA Mileage on Personal Car Pjm		0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	10000 MI	0	0	0	0	3,100	3,100	0.31
s*								
USR AA Lodging; three mo for PjM plu		0.00	0.00	0.00	0.00	80.00	80.00	
s	10.00 DAY	0	0	0	0	800	800	80.00
additional visits during								
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	10.00 DAY	0	0	0	0	380	380	38.00
USR AA Airfare Trips for HSM, QCSyst		0.00	0.00	0.00	0.00	500.00	500.00	
ems	2.00 EA	0	0	0	0	1,000	1,000	500.00
Mngr,								
USR AA Rental Car HSM visits (4) and		0.00	0.00	0.00	0.00	45.00	45.00	
2	6.00 DAY	0	0	0	0	270	270	45.00
visits by QC Systems Mgr.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	6.00 EA	0	0	0	0	120	120	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00 JOB	76,956	0	0	0	5,670	82,626	82626.00
3430.60.02.03. PURCHASING								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Secretary/Clerical IV Home		38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	16.00 HR	616	0	0	0	0	616	38.50

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PURCHASING	1.00 JOB	3,520	0	0	0	0	3,520	3520.00
3430.60.02.06. FIRST AID, FIRE, TRAFFIC, SECUR								
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S		56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00 EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower		145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00 EA	145	1	123	0	0	269	269.19
HTW AA Eye Wash Bowl		126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	4.00 EA	508	4	661	0	0	1,173	293.21
HTW AA First Aid Kit		0.00	0.00	75.00	0.00	0.00	75.00	
	16.00 EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher		0.00	0.00	150.00	0.00	0.00	150.00	
	2.00 EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	1,773	15	3,458	0	0	5,247	5246.78
3430.60.02.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	40.00 DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	520.00 DAY	0	0	6,240	0	0	6,240	12.00
USR AA Install/Decon Personnel Decon		192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00 LS	192	1	250	0	0	443	443.30
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	6.00 MO	0	4,800	0	0	0	4,800	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	6.00 MO	0	2,100	0	0	0	2,100	350.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	6.00 MO	0	2,550	0	0	0	2,550	425.00
USR AA Labor Allowance for Site Specific Training		120.00	0.00	0.00	0.00	0.00	120.00	
	10.00 EA	1,200	0	0	0	0	1,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	10.00 EA	2,000	0	0	0	0	2,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	10.00 EA	0	0	0	3,500	0	3,500	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	3,392	9,451	9,180	3,500	0	25,523	25523.30
3430.60.02.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	6.00 MO	0	0	0	0	450	450	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	6.00 MO	0	0	0	0	2,400	2,400	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	12.00 MO	0	0	0	0	1,020	1,020	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	6.00 MO	0	0	2,400	0	0	2,400	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	6.00 MO	0	3,600	0	0	0	3,600	600.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	6.00 MO	0	600	0	0	0	600	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	6.00 MO	0	0	0	0	300	300	50.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	1.00 EA	0	3,000	0	0	0	3,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	1.00 EA	0	2,000	0	0	0	2,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	1.00 EA	0	100	0	0	0	100	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	1.00 EA	0	0	0	600	0	600	600.00
USR AA Small Tool Allowance		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Water Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	9,300	4,700	4,500	6,570	25,070	25070.00
3430.60.02.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	300.00	300.00	
	6.00 MO	0	0	0	0	1,800	1,800	300.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	6.00 MO	0	0	0	0	2,700	2,700	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	6.00 MO	0	0	0	600	1	601	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	600	4,501	5,101	5100.60
TOTAL GENERAL CONDITIONS	1.00 JOB	208,485	29,766	17,338	8,600	39,891	304,080	304079.67

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60.05. DEMO GWTP									
L UPB AA CRANE,HYD,S/P,RT,4WD,40T/84'B			56.51	116.82	0.00	0.00	0.00	173.32	
OOM	160.00	HR	9,041	18,691	0	0	0	27,732	173.32
CIV AA Demo Welded Steel Pipe, 4" Di			7.63	1.07	0.00	0.00	0.00	8.70	
a	2000.00	LF	15,259	2,132	0	0	0	17,391	8.70
CIV AA Demo Welded St Pipe 6" to 12"			14.17	1.98	0.00	0.00	0.00	16.15	
Dia	400.00	LF	5,668	792	0	0	0	6,459	16.15
L AIR AA Structure Demo			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
L AIR AA Equipment Demo/Removal			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
TOTAL DEMO GWTP	1.00	JOB	50,760	34,260	0	0	0	85,020	85019.86
3430.60.10. DEMO PIPING									
L CIV AA Demo Welded Steel Pipe, 4" Di			2.48	0.35	0.00	0.00	0.00	2.83	
a	31320	LF	77,661	10,849	0	0	0	88,510	2.83
L CIV AA Demo Welded St Pipe 6" to 12"			6.20	0.87	0.00	0.00	0.00	7.06	
Dia	4000.00	LF	24,796	3,464	0	0	0	28,260	7.06
TOTAL DEMO PIPING	1.00	JOB	102,457	14,313	0	0	0	116,770	116769.92
3430.60.15. PLUG & ABANDON WELLS									
USR AA Plug and Abandon Injection &			0.00	0.00	0.00	6.00	0.00	6.00	
Extraction Wells	36851	LFT	0	0	0	221,106	0	221,106	6.00
USR AA Plug & Abandon VEA & DPT at			0.00	0.00	0.00	100.00	0.00	100.00	
Surface	400.00	EA	0	0	0	40,000	0	40,000	100.00
TOTAL PLUG & ABANDON WELLS	1.00	JOB	0	0	0	261,106	0	261,106	261106.00
3430.60.20. DISPOSALS									
USR AA Transportation & Disposal at			0.00	0.00	0.00	200.00	0.00	200.00	
RCRA Landfill (Non-Hazardous)	2000.00	TON	0	0	0	400,000	0	400,000	200.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Transportation & Disposal -			0.00	0.00	0.00	1000.00	0.00	1000.00	
Hazardous	200.00	TON	0	0	0	200,000	0	200,000	1000.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	600,000	0	600,000	600000.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	361,701	78,339	17,338	869,706	39,891	1,366,975	113914.62
TOTAL 7TH YEAR O&M	12.00	MO	1,446,596	145,759	113,333	1,538,952	412,190	3,656,830	304735.84

3435. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435. 8TH YEAR O&M									
3435. 5. GENERAL CONDITIONS									
3435. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	8.00	HR	827	0	0	0	0	827	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	4.00	HR	290	0	0	0	0	290	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	4.00	HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	4.00	HR	339	0	0	0	0	339	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00	HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	4.00	HR	414	0	0	0	0	414	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	2.00	HR	207	0	0	0	0	207	103.40
ana									
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	400.00	MI	0	0	0	0	124	124	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	2.00	DAY	0	0	0	0	84	84	42.00
USR AA Tolls			0.00	0.00	0.00	0.00	10.00	10.00	
	2.00	EA	0	0	0	0	20	20	10.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00

3435. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	5,711	0	0	0	318	6,029	502.43
TOTAL GENERAL CONDITIONS	12.00 MO	5,711	0	0	0	318	6,029	502.43

3435.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.49. SAMPLING & ANALYSIS								
3435.49.10. COMPLIANCE MONITORING								
3435.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	138.00 EA	0	0	0	19,320	0	19,320	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	138.00 EA	0	0	0	21,390	0	21,390	155.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	18.00 EA	0	0	1,782	0	0	1,782	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	18.00 EA	0	0	90	0	0	90	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	1,912	40,710	0	42,622	3551.86
3435.49.10.25. SAMPLING TECHNICIANS								
3435.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00

3435.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3435.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43

3435.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.55. QC & ANALYTICAL DATA VALIDATION									
3435.55. 5. DATA VALIDATION									
3435.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL MONITORING WELL SAMPLES	1.00	YR	2,376	0	0	0	0	2,376	2376.00
TOTAL DATA VALIDATION	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL 8TH YEAR O&M	12.00	MO	42,196	0	2,912	40,910	9,224	95,242	7936.86
TOTAL McCORMICK&BAXTER SUPERFUND SI	1.00	EA	14285253	802,051	9,389,686	17295772	25536223	67,308,985	67308985.45

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	AASBC	2 B-asbtswkr + Small Tools				PROD = 100%			CREW HOURS =	1611
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
MIL	B-ASBTSWKRF	Asbestos Workers	0.50	HR	62.89	0.50	31.44			31.44
MIL	XMIXX020 E	Small Tools	0.68	HR	1.57			0.68	1.07	1.07
	TOTAL					2.50	156.22	0.68	1.07	157.29
	AASBG	3 B-asbtswkr + 1 Flatbed Truck				PROD = 100%			CREW HOURS =	1
MIL	XMIXX010 E	Misc. Power Tools	0.50	HR	6.40			0.50	3.20	3.20
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	B-ASBTSWKRF	Asbestos Workers	1.00	HR	62.89	1.00	62.89			62.89
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
	TOTAL					3.00	187.66	3.50	19.73	207.39
	ACARA	1 B-carpnter + Small Tools				PROD = 100%			CREW HOURS =	40
MIL	B-CARPNTERL	Carpenters	1.00	HR	44.71	1.00	44.71			44.71
MIL	B-CARPNTERF	Carpenters	0.25	HR	45.21	0.25	11.30			11.30
MIL	XMIXX020 E	Small Tools	0.31	HR	1.57			0.31	0.49	0.49
	TOTAL					1.25	56.01	0.31	0.49	56.50
	CLACC	3 B-laborer + 1 Hand Compaction Rammer				PROD = 100%			CREW HOURS =	29
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	C10WC003 E	COMPACTOR, RAMMER, 13"X11" SHOE	1.00	HR	2.33			1.00	2.33	2.33
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					3.00	115.67	1.23	2.69	118.36
	CODEA	1 B-eqoprcrn + 1 1 Cy Hydr. Excavator				PROD = 100%			CREW HOURS =	17
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	H25CA004 E	HYD EXCAV,CRWLR, 1.00CY BKT,LON	1.00	HR	42.66			1.00	42.66	42.66
MIL	XMIXX020 E	Small Tools	0.11	HR	1.57			0.11	0.17	0.17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	97.06	1.11	42.83	139.89
	CODEJ	2 B-laborer + 1 Loader/Backhoe				PROD = 100%			CREW HOURS =	11
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.13	HR	1.57			0.13	0.20	0.20
	TOTAL					3.25	143.01	1.13	18.19	161.20

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	CODEP	4 B-plumber + 1 1.5 Cy Hydr. Excavator, Cwlr			PROD = 100%				CREW HOURS =	57
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	2.00	HR	50.69	2.00	101.38			101.38
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER F	Plumbers	1.00	HR	51.19	1.00	51.19			51.19
MIL	H25CA016 E	HYD EXCAV, CRWLR, 1.50 CY BKT	1.00	HR	61.83			1.00	61.83	61.83
MIL	XMIXX020 E	Small Tools	1.02	HR	1.57			1.02	1.60	1.60
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					6.00	292.07	3.02	69.91	361.98
	CODLB	1 B-eqoprmed + 1 1.5 Cy Front End Ldr, Cwlr			PROD = 100%				CREW HOURS =	17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50	HR	38.39	0.50	19.19			19.19
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
	TOTAL					1.50	76.20	1.00	32.06	108.26
	CODTK	1 B-eqoprmed + 1 Dozer/Roller, Cat D-8L, 335 Hp			PROD = 100%				CREW HOURS =	133
MIL	B-EQOPRCRNF	Equip. Operators, Crane/Shovel	0.25	HR	59.17	0.25	14.79			14.79
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	R40S0001 E	ROLLR,VIB,SD,TOW,SHPF,25.5T,72"	1.00	HR	25.53			1.00	25.53	25.53
MIL	T10CA017 E	BLADE, UNIVERSAL, HYDR (FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
	TOTAL					1.25	73.46	3.00	121.45	194.91
	COETF	2 B-laborer + 1 8 Cy Dump Truck,Bckhoe/Loadr			PROD = 100%				CREW HOURS =	6
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.37	HR	1.57			0.37	0.58	0.58
MIL	T40XX008 E	REAR DUMP BODY, 8 CY,(30,000 GV	1.00	HR	2.75			1.00	2.75	2.75
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
	TOTAL					4.00	177.65	3.37	54.97	232.62
	COETL	3 B-laborer + 2 12 Cy Dump Trck/CrawlrLoadr			PROD = 100%				CREW HOURS =	80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	2.00	HR	43.87	2.00	87.73			87.73
MIL	L35CA007 E	LDR,FE, CRWLR, 3.75 CY	1.00	HR	84.68			1.00	84.68	84.68
MIL	XMIXX020 E	Small Tools	0.28	HR	1.57			0.28	0.44	0.44
MIL	T40XX010 E	REAR DUMP BODY,12 CY,(36,000 GV	2.00	HR	2.82			2.00	5.63	5.63
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	2.00	HR	33.66			2.00	67.31	67.31
	TOTAL					6.00	259.91	5.28	158.06	417.97

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	COFGA	1 B-eqoprmed + 1 Grader 12-G			PROD = 1008				CREW HOURS =	12
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
	TOTAL					2.00	95.40	1.00	33.04	128.44
	COKBD	2 B-laborer + 1 Bitum.Dist.Truck/Sweepr			PROD = 1008				CREW HOURS =	1
MIL	A25RS007 E	ASPH DISTR, 3000 GAL, (ADD TR	1.00	HR	15.33			1.00	15.33	15.33
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-TRKDVRLTL	Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	B15MB004 E	STR SWEEPER, 7'W/SPRINKER, TOWE	1.00	HR	4.05			1.00	4.05	4.05
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
	TOTAL					4.00	163.13	4.00	67.28	230.41
	COMCE	Dozer D6 + Dozer D8 + Ripper + Truck			PROD = 1008				CREW HOURS =	30
MIL	B20VE001 E	BRUSH CHIPPER, 6" DIA. LOG, TRL	2.00	HR	15.44			2.00	30.89	30.89
MIL	L10BS002 E	MULTIAPPLIC RAKE FOR D8L TRACTO	2.00	HR	4.98			2.00	9.96	9.96
MIL	R10CA011 E	RIPPER,SING-SHNK BEAM, HYD, D-8	1.00	HR	8.33			1.00	8.33	8.33
MIL	R10CA013 E	RIPPER, SHANKS EA, D-8	1.00	HR	0.72			1.00	0.72	0.72
MIL	T10CA010 E	BLADE, ANGLE, HYDR, FOR D6	1.00	HR	4.32			1.00	4.32	4.32
MIL	T10CA011 E	WINCH,(W/O CABLE),FOR D6 TRACTO	1.00	HR	5.55			1.00	5.55	5.55
MIL	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA008 E	DOZER,CWLR,D-6D,PS,(ADD BLADE)	1.00	HR	35.45			1.00	35.45	35.45
MIL	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T50FO004 E	TRK,HWY,4X4,F250,3/4T,8800 GVW	1.00	HR	8.70			1.00	8.70	8.70
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	B-EQOPRLT L	Eq Oper, Light	2.00	HR	54.50	2.00	108.99			108.99
MIL	B-EQOPRMEDL	Eq Oper, Medium	2.00	HR	56.51	2.00	113.01			113.01
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	38.39	4.00	153.56			153.56
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
	TOTAL					9.00	414.45	14.00	202.98	617.43
	EELEB	2 B-electrn + Small Tools			PROD = 1008				CREW HOURS =	2702
MIL	B-ELECTRN F	Electricians	0.50	HR	36.43	0.50	18.21			18.21
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					2.50	90.07	0.23	0.36	90.43
	EELEF	4 B-electrn + Small Tools			PROD = 1008				CREW HOURS =	422
MIL	B-ELECTRN F	Electricians	0.66	HR	36.43	0.66	24.04			24.04
MIL	B-ELECTRN A	Electricians	2.00	HR	29.72	2.00	59.44			59.44
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.45	HR	1.57			0.45	0.71	0.71
	TOTAL					4.66	155.34	0.45	0.71	156.04

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MPLUA	1 B-plumber + Small Tools			PROD = 1008				CREW HOURS =	997
MIL	B-PLUMBER F	Plumbers	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	XMIXX020 E	Small Tools	0.34	HR	1.57			0.34	0.53	0.53
	TOTAL					1.25	63.49	0.34	0.53	64.02
	MPLUC	1 B-plumber + Small Tools			PROD = 1008				CREW HOURS =	84
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.10	HR	51.19	0.10	5.12			5.12
MIL	XMIXX020 E	Small Tools	0.19	HR	1.57			0.19	0.30	0.30
	TOTAL					1.10	55.81	0.19	0.30	56.11
	MPLUE	1 B-plumber/laborer + Small Tools			PROD = 1008				CREW HOURS =	1525
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.67	HR	1.57			0.67	1.05	1.05
	TOTAL					2.50	114.67	0.67	1.05	115.72
	MPLUJ	2 B-plumber + Small Tools			PROD = 1008				CREW HOURS =	718
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
	TOTAL					3.50	157.12	1.01	1.59	158.70
	MPLUK	2 B-plumber + 1 300 Amp Welding Machine			PROD = 1008				CREW HOURS =	491
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					3.50	157.12	2.01	3.23	160.35
	MSPFA	1 B-stm/pipe + Small Tools			PROD = 1008				CREW HOURS =	2757
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	XMIXX020 E	Small Tools	0.36	HR	1.57			0.36	0.57	0.57
	TOTAL					1.25	63.49	0.36	0.57	64.05

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MSPFB	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	2477
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFD	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	75
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFE	2 B-stm/pipe + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	7197
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					2.50	118.73	1.72	2.78	121.50
	MSPFH	2 B-stm/pipe + 1 200 Amp Welding Machine			PROD = 100%				CREW HOURS =	360
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	XMIXX020 E	Small Tools	0.82	HR	1.57			0.82	1.29	1.29
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					3.25	144.32	1.82	7.77	152.09
	ULABB	2 B-laborer + Small Tools			PROD = 100%				CREW HOURS =	129
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50	HR	38.89	0.50	19.44			19.44
MIL	XMIXX020 E	Small Tools	0.27	HR	1.57			0.27	0.42	0.42
	TOTAL					2.50	96.22	0.27	0.42	96.65
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS =	52
MIL	A30BG003 E	ASPH FINISHER, 10'W/SCREED,PNEU	1.00	HR	57.79			1.00	57.79	57.79
MIL	B15MB002 E	STR SWEEPER, 7'W/SPRINKER	1.00	HR	1.64			1.00	1.64	1.64
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	R30IG008 E	ROLLER,STATIC,3WHL,S/P, 12T,84"	2.00	HR	16.60			2.00	33.20	33.20
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	7.00	HR	38.39	7.00	268.73			268.73
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	3.00	HR	56.51	3.00	169.52			169.52
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRHVL	Outside Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
	TOTAL					12.00	539.12	10.00	140.56	679.68
	XLABB	2 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	83
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					2.34	90.00	1.00	1.57	91.57
	XLABC	3 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	6
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					3.34	128.39	1.00	1.57	129.96
	XPLUC	1 X-plumber + Small Tools			PROD = 100%				CREW HOURS =	12
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-PLUMBER F	Outside Plumbers	0.17	HR	51.19	0.17	8.70			8.70
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					3.17	136.17	1.00	1.57	137.74
	XSABA	3 X-eqoprmed + 1 Grader, 2 Rollers, 3 Trucks			PROD = 100%				CREW HOURS =	3
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	2.00	HR	42.48	2.00	84.96			84.96
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	T60KI002 E	TRK,WTR,OF-HY, 6000GAL,W/CAT621	1.00	HR	61.65			1.00	61.65	61.65
MIL	A10ET001 E	CHIPSPREADER,S/P, 10'W, MECH	1.00	HR	18.31			1.00	18.31	18.31
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T10CA016 E	BLADE, STRAIGHT, HYDR (FOR D8	1.00	HR	7.45			1.00	7.45	7.45
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
	TOTAL					8.00	370.15	6.00	240.47	610.62
	XSGRA	3 X-eqoprmed + 1 Shpf Roller,Grader,Water Truck			PROD = 100%				CREW HOURS =	25
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRK	1.00	HR	3.40			1.00	3.40	3.40
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
	TOTAL					6.00	289.28	6.00	88.82	378.09
	XXPLA	3 X-laborer + 1 20 Ton Crane, Hydraulic R/T			PROD = 100%				CREW HOURS =	498
MIL	C75GV002 E	CRANE,HYD,S/P,RT,4WD,20T/70'BOO	1.00	HR	33.07			1.00	33.07	33.07
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
MIL	X-PLUMBER F	Outside Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					5.50	247.96	2.00	34.64	282.60
	XXQOK	1 X-eqoprhvy + 1 25 Ton Shear/Hydr. Excavator			PROD = 100%				CREW HOURS =	160
MIL	H25CA007 E	HYD EXCAV, CRWLR, 2.00 CY BKT	1.00	HR	88.70			1.00	88.70	88.70
MIL	H25LU009 E	SHEAR,32"OPEN,32"THROAT, 9'0"RC	1.00	HR	28.11			1.00	28.11	28.11
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
	TOTAL					1.00	56.51	2.00	116.82	173.32

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	A-1E/S III	Engineer/Scientist III	23.00	0.0%	61.0%	0.00	0.00	37.03	HR	06/05/01	0.00	4400
USR	A-1E/S IV	Engineer/Scientist IV	27.00	0.0%	61.0%	0.00	0.00	43.47	HR	06/05/01	0.00	68360
USR	A-1PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	61.0%	0.00	0.00	66.82	HR	06/05/01	0.00	3600
USR	A-1S/C II	Secretary/Clerical II	12.00	0.0%	61.0%	0.00	0.00	19.32	HR	06/05/01	0.00	4400
USR	A-1SE/SII	Senior Engineer/Scientist II	33.00	0.0%	61.0%	0.00	0.00	53.13	HR	06/05/01	0.00	66266
USR	A-1SE/SIV	Senior Engineer/SCientist IV	38.50	0.0%	61.0%	0.00	0.00	61.99	HR	06/05/01	0.00	14568
USR	A-1T- VI	Technician VI	22.00	0.0%	61.0%	0.00	0.00	35.42	HR	06/05/01	0.00	20
USR	A2-E/SII	Engineer/Scientist II	19.00	0.0%	120.0%	0.00	0.00	41.80	HR	06/05/01	0.00	3900
USR	A2-E/SIII	Engineer/Scientist III	23.00	0.0%	120.0%	0.00	0.00	50.60	HR	06/05/01	0.00	80
USR	A2-E/SIV	Engineer/Scientist IV	27.00	0.0%	120.0%	0.00	0.00	59.40	HR	06/05/01	0.00	10167
USR	A2-PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	120.0%	0.00	0.00	91.30	HR	06/05/01	0.00	2939
USR	A2-PE/SIII	Prin. Engineer/Scientist III	47.00	0.0%	120.0%	0.00	0.00	103.40	HR	06/05/01	0.00	3439
USR	A2-S/CIV	Secretary/Clerical IV	17.50	0.0%	120.0%	0.00	0.00	38.50	HR	06/05/01	0.00	3610
USR	A2-SE/SI	Senior Engineer/Scientist I	30.50	0.0%	120.0%	0.00	0.00	67.10	HR	06/05/01	0.00	3010
USR	A2-SE/SII	Senior Engineer/Scientist II	33.00	0.0%	120.0%	0.00	0.00	72.60	HR	06/05/01	0.00	9312
USR	A2-SE/SIII	Senior Engineer/Scientist III	36.00	0.0%	120.0%	0.00	0.00	79.20	HR	06/05/01	0.00	240
USR	A2-SE/SIV	Senior Engineer/Scientist IV	38.50	0.0%	120.0%	0.00	0.00	84.70	HR	06/05/01	0.00	3586
USR	A2-T/AIV	Technician IV	15.00	0.0%	120.0%	0.00	0.00	33.00	HR	06/05/01	0.00	2296
USR	A2-T/AVI	Technician VI	22.00	0.0%	120.0%	0.00	0.00	48.40	HR	06/05/01	0.00	2064
MIL	B-ASBTSWKR	Asbestos Workers	38.50	0.0%	41.4%	7.93	0.00	62.39	HR	06/05/01	25.09	4031
MIL	B-CARPNTER	Carpenters	23.45	0.0%	41.4%	11.54	0.00	44.71	HR	06/05/01	22.87	50
MIL	B-ELECTRN	Electricians	21.95	0.0%	41.5%	4.88	0.00	35.93	HR	06/05/01	27.92	8800
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	32.23	0.0%	41.4%	13.0%	0.00	58.67	HR	06/05/01	23.41	241
MIL	B-EQOPRLT	Equip. Operators, Light	29.28	0.0%	41.5%	13.0%	0.00	54.50	HR	06/05/01	15.97	60
MIL	B-EQOPRMED	Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	15.97	466
MIL	B-LABORER	Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	12.50	4749
MIL	B-PLUMBER	Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	22.98	6878
MIL	B-STM/PIPE	Steam / Pipefitters	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	27.95	28630
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	11.56	168
MIL	B-TRKDVRLT	Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	9.51	1
MIL	X-EQOPRMED	Outside Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	21.21	1029
MIL	X-LABORER	Outside Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	9.72	2587
MIL	X-PLUMBER	Outside Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	20.49	4241
MIL	X-TRKDVRHV	Outside Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	19.23	52
MIL	X-TRKDVRLT	Outside Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	17.09	31

** EQUIPMENT BACKUP **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	TOTAL ** HOURS
UPB	A10ET001	CHIPSPREADER,S/P, 10'W, MECH	5.67	1.96	3.75	0.93	0.26	0.04	5.70	18.31 HR	3
UPB	A25RS007	ASPH DISTR, 3000 GAL	3.98	1.10	4.32	1.42			4.51	15.33 HR	1
UPB	A30BG003	ASPH FINISHER, 10'W/SCREED,PNEUM	18.65	6.46	4.91	1.42	1.16	0.18	25.01	57.79 HR	52
UPB	B15MB002	STR SWEEPER, 7'W/SPRINKER	0.64	0.18		0.14			0.69	1.64 HR	52
UPB	B15MB004	STR SWEEPER, 7'W/SPRINKER, TOWED	0.86	0.25	1.56	0.38	0.05	0.01	0.94	4.05 HR	1
MIL	B20VE001	B-CHIPPER, 6" DIA LOG, TRLR-MTD	1.61	0.45	8.56	2.82	0.04	0.01	1.96	15.44 HR	60
MIL	C10WC003	COMPACTOR, RAMMER, 11"X13" SHOE	0.62	0.11	0.48	0.12			1.00	2.33 HR	29
MIL	C75GV002	CRANE,HYD,S/P,RT,4WD,20T/70'BOOM	10.81	4.66	3.88	1.20	1.14	0.18	11.20	33.07 HR	498
MIL	C80PA003	CRANE,HYD,TRK MTD, 4.5T/52'BOOM	1.95	0.81		0.10			1.51	4.37 HR	80
UPB	F10CA024	FORK LIFT,R/T 8,000#,16.00'L-HT	3.62	1.31	2.15	0.53	0.52	0.08	3.72	11.94 HR	200
UPB	G15CA003	GRADER,MOTOR, ARTIC, CAT 12-G	10.86	4.86	3.92	1.37	0.55	0.09	11.39	33.04 HR	40
MIL	H25CA004	HYD EXCAV,CRWLR, 1.00CY BKT,LONG	15.83	4.80	3.63	1.42			16.98	42.66 HR	17
UPB	H25CA007	HYD EXCAV, CRWLR, 2.00 CY BKT	31.61	10.66	7.26	2.84			36.33	88.70 HR	160
UPB	H25CA016	HYD EXCAV, CRWLR, 1.50 CY BKT	22.50	6.83	6.01	2.35			24.14	61.83 HR	57
UPB	H25LU009	SHEAR,32"OPEN,32"THROAT, 9'0"RCH	11.27	2.23		1.70			12.92	28.11 HR	160
MIL	L10BS002	MULTI-APPLICATION RAKE, 12.5W 9T	1.82	0.50		0.30			2.35	4.98 HR	60
UPB	L35CA004	LDR,FE, CRWLR, 1.50 CY	8.68	2.93	2.75	1.07			16.64	32.06 HR	20
UPB	L35CA007	LDR,FE, CRWLR, 3.75 CY	22.94	7.73	7.21	2.82			43.98	84.68 HR	80
MIL	L40CA001	LDR,FE, WH, 1.25 CY, ARTIC, 910E	5.79	2.23	2.06	0.89	0.83	0.13	6.01	17.93 HR	120
UPB	L50CA003	LDR,BH,WH, 1.38CY FE BKT, 30"DIP	5.53	2.11	2.44	0.80	0.48	0.07	6.55	17.99 HR	17
UPB	R10CA011	RIPPER, 1-SHANK BEAM,HYD, D-8	3.21	0.89		0.10			4.14	8.33 HR	30
UPB	R10CA013	RIPPER, SHANKS EACH, D-8	0.28	0.08					0.36	0.72 HR	30
UPB	R30CA001	ROLLR,STATIC,S/P,13T,84"W,11TIRE	5.11	1.54	2.44	0.60	0.98	0.15	4.75	15.58 HR	77
UPB	T10CA010	BLADE, ANGLE, HYDR, D-6	1.71	0.58		0.08			1.96	4.32 HR	30
MIL	T10CA011	WINCH, (ADD CABLE), D-6	2.20	0.74		0.08			2.53	5.55 HR	30
UPB	T10CA016	BLADE, STRAIGHT, HYDR, D-8	2.95	0.99		0.12			3.38	7.45 HR	3
UPB	T10CA017	BLADE, UNIVERSAL, HYDR, D-8	3.15	1.06		0.13			3.61	7.95 HR	163
MIL	T15CA008	DOZER,CWLR, D-6D,PS	9.01	3.34	4.80	1.78			16.52	35.45 HR	30
MIL	T15CA015	DOZER,CWLR, D-8L,PS	26.41	8.90	11.50	3.32			37.85	87.97 HR	166
MIL	T30DW001	TRENCHR,CHN, 24"DP,6"W,WLK-BEHND	0.41	0.12	0.78	0.22	0.04	0.01	0.51	2.08 HR	32
UPB	T40XX008	REAR DUMP BODY, 8.0CY	1.20	0.33		0.09			1.13	2.75 HR	6
UPB	T40XX010	REAR DUMP BODY, 12.0CY	1.23	0.34		0.09			1.16	2.82 HR	160
MIL	T40XX016	FLATBED, 8'x 16.0'	0.34	0.09					0.27	0.71 HR	53
UPB	T40XX033	WATER TANK, 3000 GAL	1.63	0.45					1.32	3.40 HR	25
MIL	T50FO002	TRK,HWY, 6,250GVW,4X4, 1/2T-PKUP	1.75	0.49	2.41	0.70	0.22	0.03	1.91	7.52 HR	640
UPB	T50FO004	TRK,HWY, 8,800GVW,4X4, 3/4T-PKUP	2.03	0.56	2.83	0.82	0.23	0.03	2.21	8.70 HR	30
UPB	T50FO011	TRK,HWY, 24,700 GVW, 4X2, 2 AXLE	2.87	0.97	4.94	1.32	1.03	0.16	2.96	14.25 HR	106
MIL	T50KE003	TRK,HWY, 46,000 GVW, 6X4, 3 AXLE	9.42	2.64	9.46	2.73	0.44	0.07	8.89	33.66 HR	193
UPB	T60KI002	TRK,WTR,OF-HY, 6000GAL,W/CAT621E	18.15	7.76	10.45	3.45	4.07	0.63	17.13	61.65 HR	3
UPB	W35XX002	WELDER, 200 AMP, W/1 AXLE TRLR	0.49	0.17	4.18	1.03	0.03	0.01	0.57	6.48 HR	417
UPB	W35XX009	WELDER, 300 AMP, SKID,ELEC DRIVE	0.37	0.09	0.66	0.27			0.26	1.65 HR	7688
UPB	XMIXX010	MISC. POWER TOOLS	2.17	0.76	0.60	0.27			2.60	6.40 HR	1
UPB	XMIXX020	SMALL TOOLS	0.50	0.22	0.16	0.07			0.63	1.57 HR	13767

McCORMICK & BAXTER SUPERFUND SITE

6/5/01

ASSUMED MARKUPS ON LABOR FOR ESTIMATE

	FICA	FUTA	SUI	WC	BENEFITS	OH	TOTAL
OFFICE STAFF (MANAGERS, ENGINEERS, CLERICAL)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	**120.00%**
FIELD STAFF (ENGINEERS, MANAGERS, TECHNICIANS)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	**61.00%**
CRAFT LABOR	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	**41.45%**

NOTES:

1 Workmans Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction.
Workmans Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group

2 Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group.
Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.

3 Overhead rates for craft labor are based on RS Means averages for larger construction companies.
Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resourses), training, medical surveillance, and other costs directly associated with craft labor.
Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group.
Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office.
Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).

4 State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

** PROJECT SETTINGS **

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 0.08

DATE OF ESCALATION SCHEDULE : 07/13/01

PROJECT DIRECT COST COLUMNS

Col Type	L	E	M	U	U
Rep Width	10	10	10	10	10
Title	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER

PROJECT INDIRECT COST COLUMNS

Col Type	U	P	B	X	X
Rep Width	10	10	10	0	0
Title	G&A	PROFIT	BOND	<Unused>	<Unused>

PROJECT OWNER COST COLUMNS

Col Type	U	U	X	X	X
Rep Width	10	10	0	0	0
Title	SCP CONT	BID CONT	<Unused>	<Unused>	<Unused>

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	5	.	ACCOUNT	0
Level 2 ID :	2	.	SYSTEM	0
Level 3 ID :	2	.	SUBSYSTM	0
Level 4 ID :	2	.	ASSY CAT	0
Level 5 ID :	2	.	ASSEMBLY	0
Level 6 ID :	2	.	LEVEL 6	0

Owner Cost Level : 2

** PROJECT SETTINGS **

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)
Shadow	X	X	X	X	X

DETAIL REPORT FORMATTING

PAGE OPTIONS
Page Break Levels : 2
Table of Contents Levels : 4

	0	1	2	3	4	5	6	7
ROW OPTIONS								
Print Titles at Levels :		Y	Y	Y	Y	Y	Y	
Print Totals at Levels :		Y	Y	Y	Y	Y	Y	
Print Notes at Levels :	Y	Y	Y	Y	Y	Y	Y	Y

Print Unit Cost Row : Y
Print Page Footer : N
Show Cost Codes : Y

COLUMNS OPTIONS
Print Crew Id : N
Crew Output : N
Unit Cost : Y

UPB TITLES
No. of Levels to Print : 0
Bracket Titles With : < >
Include titles Notes : Y

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 G&A : G&A; 6%
Column 2 PROFIT : PROFIT; 10%
Column 3 BOND : BOND; 0.5%
Column 4 <Unused> :
Column 5 <Unused> :

Column 1 SCP CONT : Scope Contingency
Column 2 BID CONT : Bid Contingency
Column 3 <Unused> :
Column 4 <Unused> :
Column 5 <Unused> :

STANDARD COLUMN WIDTHS

Quantity Columns : 8
Total cost Columns : 12
Unit Cost Columns : 14

SUMMARY FEATURES

Round Totals Column : N-None
Contingency Notes : Yes
Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)
Show Markup at Level : 2
Display Indirect/Owner Markup as : B - Percent of Total
CSI Sort at Level : (None)

** PROJECT SETTINGS **

REPORT SELECTION

Project Settings : Y Profit Guidelines : N
Contractor Settings : Y
Link Listing : N Measurement Units : U.S.

	REPORT FORMAT TYPE			FOR LEVEL (S)						
	Direct	Indirect	Owner	0	1	2	3	4	5	6
Detail :	Y									
Project :	N	Y	N		Y	Y	Y	N	N	N
Contractor :	N	N		N	N	N	N	N	N	N
Division :	N	N	N	N	N	N	N	N	N	N
System :	N	N	N	N	N	N	N	N	N	N
2nd View :	N									
Crew :	Y			Y	N	N	N	N	N	N
Labor :	Y									
Equipment :	Y									
Prime Labor Cost Level :	N									

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3300.05 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3300.10 SUBMITTALS/IMPLEMENTATION PLANS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3300.12 ENGINEERING							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.15 MOBE, SITE WORK, TEMP FACILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.20 TREATMENT SYSTEM CONSTRUCTION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.25 START UP, TESTING, O&M PLAN							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.30 DEMOBILIZATION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3400.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3400.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3405.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3405.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3410.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3410.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3415.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3415.60 REMOVE/DEMO STEAM EQUIPMENT							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3420. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3420.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3425.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3425.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3430.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3430.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.60 DEMO/REMOVAL TREATMENT SYSTEM							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3435.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** CONTRACTOR SETTINGS **

	AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor										
G&A; 6%	6.00									
PROFIT; 10%	10.00									
BOND; 0.5%	0.50									
PL Mechanical Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
PV Paving Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
EL Electrical Contractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									

No errors detected...

* * * END OF ERROR REPORT * * *

APPENDIX C

Thermal Treatment Scenario #3—
MPA, CPA, North-MPA, South-MPA, South-CPA, and East-MPA

APPENDIX C-1

Cost Estimate Summary—
Scenario #3

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - THERMAL TREATMENT TECHNOLOGY
MAIN PROCESS AREA (MPA), CELLON PROCESS AREA (CPA), NORTH-MPA
SOUTH-MPA, SOUTH-CPA, EAST-MPA, AND OILY WASTE PONDS AREA (OWPA)

SCENARIO 3 - MPA, CPA, N-MPA, S-MPA, S-CPA, E-MPA, OWPA

CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:

MPA and CPA are historic sources of NAPL. N-MPA, S-MPA, S-CPA, E-MPA, and OWPA have known or suspected subsurface NAPL. Scenario 3 contains 2.95 million cubic yards of impacted soil (100 percent of estimated volume of impacted soil). This scenario included thermal treatment by steam and electrical resistance heating; vapor and NAPL/groundwater extraction and treatment; treated water reinjection; and short- and long-term site monitoring for 30 years.

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300 CAPITAL COSTS					
3300.05 GENERAL CONDITIONS					
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1	JOB	1,540,060.00	1,540,060	6 months of procurement, 18 months of construction support.
3300.05.02 ADMINISTRATION HOME OFFICE	1	JOB	468,967.00	468,967	Management and cost control.
3300.05.03 PURCHASING	1	JOB	145,143.00	145,143	Procurement of equipment, materials, supplies, subcontractors.
3300.05.06 FIRST AID, FIRE, TRAFFIC & SECURITY	1	JOB	160,127.00	160,127	Includes 24-hour security.
3300.05.07 HEALTH & SAFETY	1	JOB	85,407.00	85,407	Equipment and supplies, site-specific training and medical.
3300.05.09 TEMPORARY CONSTRUCTION FACILITIES	1	JOB	139,225.00	139,225	Contractor's office and storage, utility connections.
3300.05.10 PROJECT UTILITIES	1	JOB	22,150.00	22,150	Service fees for construction period.
3300.05.15 PATENT FEES	1	JOB	117,183.00	117,183	Allocation of $100,000; fee structure has not been determined.
SUBTOTAL GENERAL CONDITIONS	**1**	**JOB**		**2,678,262**	
Scope Contingencies 5%				133,913	Risk associated with incomplete design.
SUBTOTAL				**2,812,175**	
Bid Contingencies 10%				281,218	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCLUDING CONTINGENCY				**3,093,393**	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS					
3300.10.01 Construction Work Plan	1	EA	14,331.00	14,331	Work activities, sequence, and schedules.
3300.10.02 Contractors Quality Control Management Plan	1	EA	8,556.00	8,556	Quality control responsibility, procedures, and corrective action.
3300.10.03 Contractors Chemical Quality Control Plan	1	EA	16,141.00	16,141	Chemical quality control responsibility, controls, validation
3300.10.05 Regulatory Compliance Plan/Update	1	EA	45,643.00	45,643	Regulatory requirements, reporting, and compliance activities.
3300.10.06 Traffic Routing Plan	1	EA	2,319.00	2,319	Impact to W. Washington Street, internal traffic routing & safety.
3300.10.07 Site Health and Safety Plan	1	EA	13,834.00	13,834	Worker and visitor health and safety requirements, procedures.
3300.10.15 Performance Testing Plan	1	EA	12,566.00	12,566	Boiler source testing, emissions control system requirements.
3300.10.41 Subcontracting Plan	1	EA	2,811.00	2,811	Competitive and non-discriminatory policies and procedures.
3300.10.42 Environmental Protection Plan	1	EA	3,905.00	3,905	Site-specific policies and procedures.
3300.10.43 Correct/Emerg Contingency Action Plan	1	EA	3,591.00	3,591	Emergency response policies and procedures.
SUBTOTAL SUBMITTALS/IMPLEMENTATION PLANS	**1**	**JOB**		**123,697**	
Scope Contingencies 5%				6,185	Risk associated with incomplete design.
SUBTOTAL				**129,882**	
Bid Contingencies 5%				6,494	Risks associated with changed conditions after contract award.
TOTAL SUBMITTALS/IMPLEMENTATION PLANS INCL. CONTINGENCY				**136,376**	
3300.12 ENGINEERING					
3300.12.10 Completion Design - Civil	1	JOB	215,804.00	215,804	Building structure, concrete, pipelines, utility extensions.
3300.12.15 Completion Design - Process	1	JOB	504,824.00	504,824	Wastewater treatment system, equipment, plant piping
3300.12.20 Completion Design - Electrical	1	JOB	114,968.00	114,968	Services, controls, lighting, instrumentation, motors.
3300.12.26 PCS Programming	1	JOB	35,937.00	35,937	Process control, programmable logic control, interfaces.
3300.12.32 Completion Design - Mechanical	1	JOB	75,208.00	75,208	Piping, instrumentation, HVAC, plumbing.
3300.12.37 Completion Design - Specialty Subcontractor	1	JOB	937,464.00	937,464	Steam and electrical resistance heating, instrumentation, controls.
SUBTOTAL ENGINEERING	**1**	**JOB**		**1,884,205**	
Scope Contingencies 10%				188,421	Risk associated with incomplete design.
SUBTOTAL				**2,072,626**	
Bid Contingencies 10%				207,263	Risks associated with changed conditions after contract award.
TOTAL ENGINEERING INCLUDING CONTINGENCY				**2,279,888**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300.15 MOBE, SITE WORK, TEMP FACILITIES					
3300.15.01 CLEAR SITE BRUSH	30	ACR	723.52	21,706	Site preparation for field activities.
3300.15.02 MOBE EQUIP & FACILITIES	1	JOB	1,505.00	1,505	Heavy equipment, personnel to project site.
3300.15.05 TEMPORARY FACILITIES	1	JOB	306,006.00	306,006	Trailers, utilities (water, sewer, electricity, gas, phones), paving.
3300.15.08 SIGNS, BARRICADES	1	JOB	93,223.00	93,223	Traffic, dust, erosion, and site cleaning.
3300.15.10 GRAVEL CAP	22	ACR	26,990.40	593,789	22.2 acres, 6-inch thick for site access, fugitive emissions control.
3300.15.15 ASPHALT CAP	4222	SY	26.07	110,068	0.9 acre, 4-inch thick for Cellon Process Area emission control.
3300.15.92 SURVEYS	1	JOB	33,983.00	33,983	Layout and construction control surveys.
3300.15.97 MEETINGS	2	EA	6,700.22	13,400	Preconstruction meeting, coordination meetings.
SUBTOTAL MOBE, SITE WORK, TEMP FACILITIES	**1**	**JOB**		**1,173,679**	
Scope Contingencies 10%				117,368	Risk associated with incomplete design.
SUBTOTAL				**1,291,047**	
Bid Contingencies 10%				129,105	Risks associated with changed conditions after contract award.
TOTAL MOBE, SITE WORK, TEMP FACILITIES INCL CONTINGENCY				**1,420,152**	
3300.20 TREATMENT SYSTEM CONSTRUCTION					
3300.20.01 TREATMENT PLANT BUILDING	1	JOB	548,878.00	548,878	Temporary (Sprung or Rubb type), 100 ft by 200 ft, concrete slab.
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1	JOB	6,824,447.00	6,824,447	Expedite fabrication, submittals, purchasing, shipping & install.
3300.20.07 WELL INSTRUMENTS/CONTROLS	1	JOB	3,463,989.00	3,463,989	Cables, vertical electrode arrays, instruments, and power supply.
3300.20.10 INSTALL WELLS	1	JOB	13,060,699.00	13,060,699	Extraction, injection wells, instrumentation, and pumps.
3300.20.15 PIPING	1	JOB	6,351,829.00	6,351,829	Steam, vapor, NAPL/groundwater, air piping, headers and laterals.
SUBTOTAL TREATMENT SYSTEM CONSTRUCTION	**1**	**JOB**		**30,249,842**	
Scope Contingencies 10%				3,024,984	Risk associated with incomplete design.
SUBTOTAL				**33,274,826**	
Bid Contingencies 10%				3,327,483	Risks associated with changed conditions after contract award.
TOTAL TREATMENT SYSTEM CONSTRUCTION INCL CONTINGENCY				**36,602,309**	
3300.25 STARTUP, TESTING, O&M MANUAL					
3300.25.05 O&M MANUAL	1	JOB	50,439.00	50,439	Operation and maintenance procedures and system control.
3300.25.10 STARTUP/COMMISSION TREATMENT SYSTEM	1	JOB	669,131.00	669,131	Startup, equipment shake-down, training and testing.
SUBTOTAL STARTUP, TESTING, O&M MANUAL	1	JOB		**719,570**	
Scope Contingencies 10%				71,957	Risk associated with incomplete design.
SUBTOTAL				**791,527**	
Bid Contingencies 10%				79,153	Risks associated with changed conditions after contract award.
TOTAL STARTUP, TESTING, O&M MANUAL INCL CONTINGENCY				**870,680**	
3300.30 DEMOBILIZATION					
3300.30.21 DEMOBILIZATION (CONSTRUCTION)	1	JOB	16,606.00	16,606	Remove construction equipment and personnel from site.
3300.30.22 REPORTS, CLOSEOUT	1	JOB	170,074.00	170,074	Closeout of chemical testing, health & safety, record drawings.
SUBTOTAL DEMOBILIZATION	**1**	**JOB**		**186,680**	
Scope Contingencies 10%				18,668	Risk associated with incomplete design.
SUBTOTAL				**205,348**	
Bid Contingencies 10%				20,535	Risks associated with changed conditions after contract award.
TOTAL DEMOBILIZATION INCLUDING CONTINGENCY				**225,883**	
TOTAL CAPITAL COSTS	**1**	**JOB**		**37,015,935**	
TOTAL CAPITAL COST, INCLUDING CONTINGENCY				**44,628,680**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400 1ST YEAR O&M					
3400.05 GENERAL CONDITIONS					
3400.05.05 OFFSITE ADMINISTRATIVE COSTS	12	MO	10,164.14	121,970	Management, administration, procurement, and data analysis.
3400.05.10 ERH SYSTEM OP/REPORTING	12	MO	33,829.17	405,950	Process control and monitoring for ERH system.
3400.05.05 SITE SECURITY	12	MO	12,831.54	153,978	Site security and control, 24 hours per day.
SUBTOTAL GENERAL CONDITIONS				**681,898**	
Scope Contingencies 5%				34,095	Risk associated with incomplete design.
SUBTOTAL				**715,993**	
Bid Contingencies 5%				35,800	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCL CONTINGENCY				**751,793**	
3400.10 SITE FACILITIES	**12**	**MO**	**4,542.79**	**54,513**	Electrical, mechanical, and instrumentation support, facilities.
Scope Contingencies 5%				2,726	Risk associated with incomplete design.
SUBTOTAL				**57,239**	
Bid Contingencies 5%				2,862	Risks associated with changed conditions after contract award.
TOTAL SITE FACILITIES INCLUDING CONTINGENCY				**60,101**	
3400.15 HEALTH & SAFETY	**12**	**MO**	**925.75**	**11,109**	Personal protective equipment, health and safety monitoring.
Scope Contingencies 5%				555	Risk associated with incomplete design.
SUBTOTAL				**11,664**	
Bid Contingencies 5%				583	Risks associated with changed conditions after contract award.
TOTAL HEALTH & SAFETY INCLUDING CONTINGENCY				**12,248**	
3400.20 MATERIALS & SUPPLIES	**12**	**MO**	**351.55**	**4,219**	Routine maintenance supplies and materials.
Scope Contingencies 10%				422	Risk associated with incomplete design.
SUBTOTAL				**4,640**	
Bid Contingencies 10%				464	Risks associated with changed conditions after contract award.
TOTAL MATERIALS & SUPPLIES INCL CONTINGENCY				**5,105**	
3400.25 MAINTENANCE	**12**	**MO**	**7,820.01**	**93,840**	Parts, PLC and well maintenance, well redevelopment.
Scope Contingencies 10%				9,384	Risk associated with incomplete design.
SUBTOTAL				**103,224**	
Bid Contingencies 10%				10,322	Risks associated with changed conditions after contract award.
TOTAL MAINTENANCE INCL CONTINGENCY				**113,547**	
3400.30 UTILITIES	**12**	**MO**	**984001.57**	**11,808,019**	Electricity and natural gas purchase; co-generation credit, water.
Scope Contingencies 10%				1,180,802	Risk associated with incomplete design.
SUBTOTAL				**12,988,821**	
Bid Contingencies 10%				1,298,882	Risks associated with changed conditions after contract award.
TOTAL UTILITIES INCLUDING CONTINGENCY				**14,287,703**	
3400.35 SITE O&M LABOR & MISC EQUIPMENT	**12**	**MO**	**94,376.34**	**1,132,516**	Plant manager and operators, 3 shifts per day, 365 days per year.
Scope Contingencies 10%				113,252	Risk associated with incomplete design.
SUBTOTAL				**1,245,768**	
Bid Contingencies 10%				124,577	Risks associated with changed conditions after contract award.
TOTAL SITE O&M LABOR & MISC EQ INCL CONTINGENCY				**1,370,344**	
3400.40 CHEMICALS	**12**	**MO**	**12,873.04**	**154,476**	Granular activated carbon, water treatment chemicals.
Scope Contingencies 10%				15,448	Risk associated with incomplete design.
SUBTOTAL				**169,924**	
Bid Contingencies 10%				16,992	Risks associated with changed conditions after contract award.
TOTAL CHEMICALS INCLUDING CONTINGENCY				**186,917**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400.45 DISPOSALS					
3400.45.05 SLUDGE	12	MO	4,101.41	49,217	450 tons per year, offsite disposal.
3400.45.10 CARBON (GAC, VAPOR PHASE)	12	MO	761.69	9,140	Steam regeneration; offsite disposal of 15,000 pounds per year.
3400.45.15 CARBON (GAC, LIQUID PHASE)	12	MO	2,201.09	26,413	Steam regeneration; offsite disposal of 49,000 pounds per year.
3400.45.20 PPE & MISC	12	MO	195.31	2,344	Disposal allowance.
3400.45.25 OILY WASTE	12	MO	26,240.57	314,887	Average recovery, 135,714 gal/year; 950,000 gal over 7 years.
3400.45.30 WASTE MISC COSTS	12	MO	1,367.14	16,406	Tanks and liners, recurring waste handling and loadouts.
SUBTOTAL DISPOSALS				**418,407**	
Scope Contingencies 10%				41,841	Risk associated with incomplete design.
SUBTOTAL				**460,247**	
Bid Contingencies 10%				46,025	Risks associated with changed conditions after contract award.
TOTAL DISPOSALS INCLUDING CONTINGENCY				**506,272**	
3400.49 SAMPLING & ANALYSIS					
3400.49.05 PERFORMANCE MONITORING	12	MO	1,471.36	17,656	See Table 3-1 of Cost Estimate Report.
3400.49.10 COMPLIANCE MONITORING	12	MO	19,056.66	228,680	See Table 3-1 of Cost Estimate Report.
SUBTOTAL SAMPLING & ANALYSIS	**12**	**MO**		**246,336**	
Scope Contingencies 10%				24,634	Risk associated with incomplete design.
SUBTOTAL				**270,970**	
Bid Contingencies 5%				13,548	Risks associated with changed conditions after contract award.
TOTAL SAMPLING & ANALYSIS INCL CONTINGENCY				**284,518**	
3400.55 QC & ANALYTICAL DATA VALIDATION					
3400.55.05 DATA VALIDATION	12	MO	2,262.22	27,147	Validation of chemical data for air, water, and process control.
SUBTOTAL QC & ANALYTICAL DATA VALIDATION	**12**	**MO**		**27,147**	
Scope Contingencies 5%				1,357	Risk associated with incomplete design.
SUBTOTAL				**28,504**	
Bid Contingencies 5%				1,425	Risks associated with changed conditions after contract award.
TOTAL QC & ANALYTICAL DATA VALIDATION INCL CONTINGENCY				**29,929**	
TOTAL 1ST YEAR O&M	**12**	**MO**		**14,632,480**	
TOTAL 1ST YEAR O&M COST, INCLUDING CONTINGENCY				**17,608,476**	
TOTAL McCORMICK & BAXTER SUPERFUND SITE SCENARIO 3					

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Five Year Review Report	5	1	EA	5,000	5,000	1 report at end of Year 5
Update O&M Plan	5	1	EA	1,500	1,500	Update Plan
Five Year Review Report	10	1	EA	5,000	5,000	1 report at end of Year 10
Five Year Review Report	15	1	EA	5,000	5,000	1 report at end of Year 15
Five Year Review Report	20	1	EA	5,000	5,000	1 report at end of Year 20
Five Year Review Report	25	1	EA	5,000	5,000	1 report at end of Year 25
Remedial Action Report	30	1	EA	300,000	300,000	Final Report
Equipment Repairs/Replacement:						
Replace Well Extract/LoFlo Pumps	5	166	EA	4,000	664,000	Replacement during active treatment.
Replace Well LoFlo Pumps	10	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	15	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	20	25	EA	1,000	25,000	Replacements during monitoring phase.
Replace Well LoFlo Pumps	25	25	EA	1,000	25,000	Replacements during monitoring phase.
Well Repairs/Replacement:						
Replace Monitoring Wells	10	10	EA	17,000	170,000	Assume replace 10 wells every 10 yr.
Replace Monitoring Wells	20	10	EA	17,000	170,000	(Add 20K/event for demo/disposals)
Demolition/Restoration Site	30	1	JOB	500,000	500,000	<Includes removal of monitoring wells

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE	NOTES
Capital Cost	0	44,628,679.97	1.00000	44,628,680	
O&M STEAM INJECT YEAR 1	1	17,608,475.81	0.93458	16,456,519	
O&M STEAM INJECT YEAR 2	2	16,065,055.00	0.87344	14,031,841	<Includes demo ERH system
O&M STEAM INJECT YEAR 3	3	12,559,770.00	0.81630	10,252,514	
O&M STEAM INJECT YEAR 4	4	10,980,409.00	0.76290	8,376,901	
O&M COOL DOWN YEAR 5	5	3,334,362.00	0.71299	2,377,354	
O&M COOL DOWN YEAR 6	6	3,308,683.00	0.66634	2,204,715	
O&M COOL DOWN YEAR 7	7	5,247,943.00	0.62275	3,268,155	<Includes demo GWTP, piping & wells
O&M MONITORING WELLS	8 to 10	385,170.00	0.54393	209,507	at end of cool down phase.
O&M MONITORING WELLS	10 to 15	641,950.00	0.42924	275,552	Only monitoring wells remain.
O&M MONITORING WELLS	15 to 20	641,950.00	0.30604	196,465	
O&M MONITORING WELLS	20 to 25	641,950.00	0.21821	140,077	
O&M MONITORING WELLS	25 to 30	641,950.00	0.15558	99,873	
Periodic Cost	5	670,500.00	0.71299	478,057	
Periodic Cost	10	200,000.00	0.50835	101,670	
Periodic Cost	15	30,000.00	0.36245	10,873	
Periodic Cost	20	200,000.00	0.25842	51,684	
Periodic Cost	25	30,000.00	0.18425	5,527	
Periodic Cost	30	800,000.00	0.13137	105,094	Restore Site/Abandon Wells

TOTAL COSTS 30 YEARS	**$118,616,848**	
TOTAL PRESENT VALUE OF SCENARIO 3		**$ 103,271,059**

APPENDIX C-2

Costlink© Scenario #3—Capital Costs and Operation & Maintenance Estimate

McCORMICK & BAXTER SUPERFUND SITE
THERMAL TREATMENT

SCENARIO 3
CAPITAL COSTS & O&M

Designed By: URS Corporation
Estimated By: URS Staff

Prepared By: John E. Spear

Preparation Date: 10/27/01
Effective Date of Pricing: 07/13/01
Est Construction Time: 600 Days

Sales Tax: 0.08

C o s t L i n k
Software Copyright (c) 1985-1998
by Building Systems Design, Inc.
Release 1.6a

CONTRACT DACA67-98-D-1005, DO #65 THERMAL TREATMENT TECHNOLOGY CONCEPTUAL DESIGN, COST ESTIMATION AND FOCUSED FEASIBILITY SUPPORT McCORMICK & BAXTER SUPERFUND SITE, STOCKTON, CALIFORNIA

SCENARIO 3, TREATMENT OF ALL SOILS INCLUDING:
MPA, CPA, N-MPA (IN OLD MORMON SLOUGH), S-CPA, S-MPA, E-MPA & OWPA.

SUMMARY REPORTS SUMMARY PAGE

PROJECT INDIRECT SUMMARY - ACCOUNT....1
PROJECT INDIRECT SUMMARY - SYSTEM....2
PROJECT INDIRECT SUMMARY - SUBSYSTM....7

DETAILED ESTIMATE DETAIL PAGE

3300. CAPITAL COSTS
05. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT....1
02. ADMINISTRATION HOME OFFICE....2
03. PURCHASING....3
06. FIRST AID, FIRE, TRAFFIC, SECUR....3
07. HEALTH & SAFETY....3
09. TEMP CONSTRUCTION FACILITIES....4
10. PROJECT UTILITIES....6
15. PATENT FEES....6
10. SUBMITTALS/IMPLEMENTATION PLANS
01. Construction Work Plan....7
02. Contractors QC Management Plan....7
03. Contractors Chem Quality Control....8
05. Regulatory Compliance Plan/Updat....8
06. Traffic Routing Plan....9
07. Site Health and Safety Plan....9
15. Performance Testing Plan....10
41. Subcontracting Plan....10
42. Environmental Protection Plan....11
43. Correct/Emerg Conting Action Pln....11
12. ENGINEERING
10. COMPLETION DESIGN - CIVIL....13
15. COMPLETION DESIGN - PROCESS....13
20. COMPLETION DESIGN - ELECTRICAL....14
26. PCS PROGRAMMING - GROUNDWATER
15. PC PROGRAMMING....14
20. MMI PROGRAMMING....15
32. COMPLETION DESIGN - MECHANICAL....15
37. COMPLETE DESIGN - SPECIALTY SUB....16
15. MOBE, SITE WORK, TEMP FACILITIES
01. CLEAR SITE BRUSH....17
02. MOBE EQUIP & FACILITIES....17
05. TEMPORARY FACILITIES
20. TEMPORARY PAVING....17
25. WATER LINE....18
30. PHONE....19
35. SEWER....19
40. ELECTRICAL SERVICE....20
45. GAS SERVICE....20
08. SIGNS, BARRICADES
5. SIGNS....21
10. BARRICADES/TEMP FENCING....21
15. EROSION CONTROL....22

DETAILED ESTIMATE DETAIL PAGE

20. STREET CLEANING....22
25. DUST CONTROL....22
10. GRAVEL CAP....23
15. ASPHALT CAP....23
92. SURVEYS
5. INITIAL LAYOUT SURVEY....23
10. SURVEY CONTROLS....23
97. MEETINGS
01. Preconstruction Meeting....24
03. Coordination Meeting....25
20. TREATMENT SYSTEM CONSTRUCTION
01. TREATMENT PLANT BUILDING....26
05. TREATMENT SYSTEM EQUIP. F&I
5. EXPEDITOR/QC EQUIP. FABRICATION....26
01. EQUIP SUBMITTAL REVIEW....26
10. EQUIPMENT PURCHASE/SHIPPING....27
12. INSTRUMENTATION/CONTROLLERS....29
13. COMPUTER....30
15. EQUIPMENT INSTALLATION....30
16. TREATMENT SYSTEM ELECTRICAL & IN....30
17. MECHANICAL....31
20. SPH 6Ph HEATING COMPONENTS....31
25. VEA & DPT COMPONENTS....32
07. WELL INSTRUMENTS/CONTROLS
10. INSTRUMENT CABLE TO WELLHEADS....32
30. WELL INSTRUMENTATION....33
35. VERTICAL ELECTRODE ARRAYS....33
40. ELECTRICAL POWER TO WELLS....34
10. INSTALL WELLS
5. EXTRACTION WELLS THERMAL....34
10. STEAM INJECTION WELLS....37
15. REINJECTION WELLS....38
20. MONITORING WELLS....39
25. TREAT WELL DRILL LIQUIDS/CUTTING....41
30. ANALYTICALS SOILS....41
35. ANALYTICALS LIQUIDS....42
40. LABOR & ODC's....42
15. PIPING
5. VAPOR RECOVERY SYSTEM....44
10. LIQUID RECOVERY SYSTEM....46
11. EXTRACTION WELLHEAD SPOOL/FTG....47
15. STEAM INJECTION SYSTEM....47
20. H2O REINJECTION SYSTEM....50
25. STEAM GENERATION SYSTEM....51
30. WATER TREATMENT SYSTEM....51
35. AIR PIPING....52
25. START UP, TESTING, O&M PLAN
5. O&M MANUAL
10. PCS Commissioning Manual....54
13. Preliminary Draft - O&M Manual....54
18. Revised Draft - O&M Manual....55

DETAILED ESTIMATE DETAIL PAGE

23. Final - O&M Manual....55
10. STARTUP/COMMISSION TREATMENT SYS
5. ENGINEERS & TECHNICIANS....56
10. TRAVEL & PER DIEM....58
15. EQUIPMENT/SUPPLIES....58
25. UTILITIES/SITE FACILITIES....58
26. OPERATING/PROCESS UTILITIES....59
30. CHEMICALS....60
35. FILTERS, OTHER CONSUMABLES....61
40. HEALTH & SAFETY....61
45. DISPOSALS STARTUP....61
50. PERSONNEL TRAINING....62
55. SAMPLING/ANALYSIS; STARTUP....62
60. SOURCE TEST....65
30. DEMOBILIZATION
21. DEMOBILIZATION
01. Removal of Temp Facilities....66
02. Removal of Temp Utilities....66
04. Demobe of Construction Equipment....66
22. REPORTS, CLOSEOUT
5. Closeout Safety Report....67
10. Record Drawings....67
15. Chemical Data Final Report....67
20. Remedial Action Report....68
3400. 1ST YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....69
10. ERH SYSTEM OP/REPORTING....70
15. SITE SECURITY....70
10. SITE FACILITIES....71
15. HEALTH & SAFETY....72
20. MATERIALS & SUPPLIES....73
25. MAINTENANCE....74
30. UTILITIES....75
35. SITE O&M LABOR & MISC EQUIPMENT....76
40. CHEMICALS....77
45. DISPOSALS
5. SLUDGE....78
10. CARBON (GAC, VAPOR PHASE)....78
15. CARBON (GAC, LIQUID PHASE)....78
20. PPE & MISC....78
25. OILY WASTE....79
30. WASTE MISC COSTS....79
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....80
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....80
10. PERIMETER MONITORING WELLS....81
15. WASTE DISPOSAL CHARACTERIZATION....81
20. GWTP DISCHARGE TO REINJECT WELLS....82

DETAILED ESTIMATE DETAIL PAGE

25. SAMPLING TECHNICIANS....83
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....85
10. MONITORING WELL SAMPLES....85
15. AIR MONITORING SAMPLES....85
20. MISC SAMPLES....85
3405. 2ND YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....86
10. ERH SYSTEM OP/REPORTING....87
15. SITE SECURITY....87
10. SITE FACILITIES....88
15. HEALTH & SAFETY....89
20. MATERIALS & SUPPLIES....90
25. MAINTENANCE....91
30. UTILITIES....92
35. SITE O&M LABOR & MISC EQUIPMENT....93
40. CHEMICALS....94
45. DISPOSALS
5. SLUDGE....95
10. CARBON (GAC, VAPOR PHASE)....95
15. CARBON (GAC, LIQUID PHASE)....95
20. PPE & MISC....95
25. OILY WASTE....96
30. WASTE MISC COSTS....96
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....97
10. SOIL SAMPLING (DRILL BACK)....97
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....98
10. PERIMETER MONITORING WELLS....99
15. WASTE DISPOSAL CHARACTERIZATION....99
20. GWTP DISCHARGE TO REINJECT WELLS....100
25. SAMPLING TECHNICIANS....101
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....103
10. MONITORING WELL SAMPLES....103
15. AIR MONITORING SAMPLES....103
20. MISC SAMPLES....103
60. DEMOBE/DEMO SPH 6PH COMPONENTS....104
3410. 3RD YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....105
15. SITE SECURITY....106
10. SITE FACILITIES....107
15. HEALTH & SAFETY....108
20. MATERIALS & SUPPLIES....109
25. MAINTENANCE....110

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....111
35. SITE O&M LABOR & MISC EQUIPMENT....112
40. CHEMICALS....113
45. DISPOSALS
5. SLUDGE....114
10. CARBON (GAC, VAPOR PHASE)....114
15. CARBON (GAC, LIQUID PHASE)....114
20. PPE & MISC....114
25. OILY WASTE....115
30. WASTE MISC COSTS....115
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....116
10. SOIL SAMPLING (DRILL BACK)....116
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....117
10. PERIMETER MONITORING WELLS....118
15. WASTE DISPOSAL CHARACTERIZATION....118
20. GWTP DISCHARGE TO REINJECT WELLS....119
25. SAMPLING TECHNICIANS....120
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....122
10. MONITORING WELL SAMPLES....122
15. AIR MONITORING SAMPLES....122
20. MISC SAMPLES....122
3415. 4TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....123
15. SITE SECURITY....124
10. SITE FACILITIES....125
15. HEALTH & SAFETY....126
20. MATERIALS & SUPPLIES....127
25. MAINTENANCE....128
30. UTILITIES....129
35. SITE O&M LABOR & MISC EQUIPMENT....130
40. CHEMICALS....131
45. DISPOSALS
5. SLUDGE....132
10. CARBON (GAC, VAPOR PHASE)....132
15. CARBON (GAC, LIQUID PHASE)....132
20. PPE & MISC....132
25. OILY WASTE....133
30. WASTE MISC COSTS....133
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....134
10. SOIL SAMPLING (DRILL BACK)....134
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....135
10. PERIMETER MONITORING WELLS....136

DETAILED ESTIMATE DETAIL PAGE

15. WASTE DISPOSAL CHARACTERIZATION.....136
20. GWTP DISCHARGE TO REINJECT WELLS.....137
25. SAMPLING TECHNICIANS.....138
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....140
10. MONITORING WELL SAMPLES.....140
15. AIR MONITORING SAMPLES.....140
20. MISC SAMPLES.....140
60. REMOVE/DEMO STEAM EQUIPMENT
5. DEMOLITION/REMOVAL EQUIPMENT.....141
10. DISPOSALS.....141
3420. 5TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....142
15. SITE SECURITY.....143
10. SITE FACILITIES.....144
15. HEALTH & SAFETY.....145
20. MATERIALS & SUPPLIES.....146
25. MAINTENANCE.....147
30. UTILITIES.....148
35. SITE O&M LABOR & MISC EQUIPMENT.....149
40. CHEMICALS.....150
45. DISPOSALS
5. SLUDGE.....151
15. CARBON (GAC, LIQUID PHASE).....151
20. PPE & MISC.....151
25. OILY WASTE.....151
30. WASTE MISC COSTS.....151
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS).....153
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS.....153
10. PERIMETER MONITORING WELLS.....154
15. WASTE DISPOSAL CHARACTERIZATION.....155
20. GWTP DISCHARGE TO REINJECT WELLS.....155
25. SAMPLING TECHNICIANS.....156
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES.....158
10. MONITORING WELL SAMPLES.....158
20. MISC SAMPLES.....158
3425. 6TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS.....159
15. SITE SECURITY.....160
10. SITE FACILITIES.....161
15. HEALTH & SAFETY.....162
20. MATERIALS & SUPPLIES.....163
25. MAINTENANCE.....164

DETAILED ESTIMATE DETAIL PAGE

30. UTILITIES....165
35. SITE O&M LABOR & MISC EQUIPMENT....166
40. CHEMICALS....167
45. DISPOSALS
5. SLUDGE....168
15. CARBON (GAC, LIQUID PHASE)....168
20. PPE & MISC....168
25. OILY WASTE....168
30. WASTE MISC COSTS....168
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....170
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....170
10. PERIMETER MONITORING WELLS....171
15. WASTE DISPOSAL CHARACTERIZATION....172
20. GWTP DISCHARGE TO REINJECT WELLS....172
25. SAMPLING TECHNICIANS....173
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....175
10. MONITORING WELL SAMPLES....175
20. MISC SAMPLES....175
3430. 7TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....176
15. SITE SECURITY....177
10. SITE FACILITIES....178
15. HEALTH & SAFETY....179
20. MATERIALS & SUPPLIES....180
25. MAINTENANCE....181
30. UTILITIES....182
35. SITE O&M LABOR & MISC EQUIPMENT....183
40. CHEMICALS....184
45. DISPOSALS
5. SLUDGE....185
15. CARBON (GAC, LIQUID PHASE)....185
20. PPE & MISC....185
25. OILY WASTE....185
30. WASTE MISC COSTS....185
49. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING
5. GWTP (PROCESS)....187
10. COMPLIANCE MONITORING
5. FUGITIVE EMISSIONS....187
10. PERIMETER MONITORING WELLS....188
15. WASTE DISPOSAL CHARACTERIZATION....189
20. GWTP DISCHARGE TO REINJECT WELLS....189
25. SAMPLING TECHNICIANS....190
15. CONFIRMATIONAL SAMPLING
10. SOIL SAMPLING (DRILL BACK)....191

DETAILED ESTIMATE DETAIL PAGE

15. LIF SURVEY....192
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....193
10. MONITORING WELL SAMPLES....193
20. MISC SAMPLES....193
60. DEMO/REMOVAL TREATMENT SYSTEM
02. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT....194
02. ADMINISTRATION HOME OFFICE....194
03. PURCHASING....195
06. FIRST AID, FIRE, TRAFFIC, SECUR....196
07. HEALTH & SAFETY....196
09. TEMP CONSTRUCTION FACILITIES....197
10. PROJECT UTILITIES....198
05. DEMO GWTP....199
10. DEMO PIPING....199
15. PLUG & ABANDON WELLS....199
20. DISPOSALS....199
3435. 8TH YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....201
49. SAMPLING & ANALYSIS
10. COMPLIANCE MONITORING
10. PERIMETER MONITORING WELLS....203
25. SAMPLING TECHNICIANS....203
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
10. MONITORING WELL SAMPLES....205

BACKUP REPORTS BACKUP PAGE

CREW BACKUP....1
LABOR BACKUP....8
EQUIPMENT BACKUP....9

* * * END TABLE OF CONTENTS * * *

Sat 27 Oct 2001
Eff. Date 07/13/01

URS Corporation
PROJECT MB0300: McCORMICK&BAXTER SUPERFUND SITE - THERMAL TREATMENT
SCENARIO 3
** PROJECT INDIRECT SUMMARY - ACCOUNT **

TIME 12:29:38
SUMMARY PAGE 1

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS	1.00	JOB	31,588,138	1,895,288	3,348,343	184,159	37,015,928	37015928.11
3400 1ST YEAR O&M	12.00	MO	12,486,862	749,212	1,323,607	72,798	14,632,480	1219373.32
3405 2ND YEAR O&M	12.00	MO	11,402,054	684,123	1,208,618	66,474	13,361,269	1113439.08
3410 3RD YEAR O&M	12.00	MO	8,899,135	533,948	943,308	51,882	10,428,273	869022.76
3415 4TH YEAR O&M	12.00	MO	7,786,691	467,201	825,389	45,396	9,124,679	760389.89
3420 5TH YEAR O&M	12.00	MO	2,388,204	143,292	253,150	13,923	2,798,569	233214.10
3425 6TH YEAR O&M	12.00	MO	2,370,094	142,206	251,230	13,818	2,777,347	231445.61
3430 7TH YEAR O&M	12.00	MO	3,803,150	228,189	403,134	22,172	4,456,645	371387.06
3435 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
TOTAL McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	80,819,571	4,849,174	8,566,875	471,178	94,706,798	94706797.69
Scope Contingency	9.67	%					9,160,181	
SUBTOTAL							103,866,979	
Bid Contingency	9.62	%					9,994,779	
TOTAL INCL OWNER COSTS							113,861,758	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
3300.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
3300.12 ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
3300.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	1,001,572	60,094	106,167	5,839	1,173,673	1173672.64
3300.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	25,814,190	1,548,851	2,736,304	150,497	30,249,843	30249842.55
3300.25 START UP, TESTING, O&M PLAN	1.00	JOB	614,057	36,843	65,090	3,580	719,570	719570.02
3300.30 DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
TOTAL CAPITAL COSTS	1.00	JOB	31,588,138	1,895,288	3,348,343	184,159	37,015,928	37015928.11
Scope Contingency	9.62	%					3,561,495	
SUBTOTAL							40,577,423	
Bid Contingency	9.98	%					4,051,248	
TOTAL INCL OWNER COSTS							44,628,671	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3400.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3400.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3400.25 MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
3400.30 UTILITIES	12.00	MO	10,076,563	604,594	1,068,116	58,746	11,808,019	984001.57
3400.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3400.40 CHEMICALS	12.00	MO	131,825	7,910	13,973	769	154,476	12873.04
3400.45 DISPOSALS	12.00	MO	357,054	21,423	37,848	2,082	418,406	34867.19
3400.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
3400.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 1ST YEAR O&M	12.00	MO	12,486,862	749,212	1,323,607	72,798	14,632,480	1219373.32
Scope Contingency	9.74	%					1,424,515	
SUBTOTAL							16,056,994	
Bid Contingency	9.66	%					1,551,481	
TOTAL INCL OWNER COSTS							17,608,475	
3405 2ND YEAR O&M								
3405. 5 GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
3405.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3405.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3405.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3405.30 UTILITIES	12.00	MO	8,889,625	533,377	942,300	51,827	10,417,129	868094.08
3405.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3405.40 CHEMICALS	12.00	MO	124,825	7,490	13,231	728	146,274	12189.47
3405.45 DISPOSALS	12.00	MO	357,194	21,432	37,863	2,082	418,570	34880.86
3405.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3405.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
TOTAL 2ND YEAR O&M	12.00	MO	11,402,054	684,123	1,208,618	66,474	13,361,269	1113439.08
Scope Contingency	9.71	%					1,297,394	
SUBTOTAL							14,658,662	
Bid Contingency	9.59	%					1,406,393	
TOTAL INCL OWNER COSTS							16,065,055	
3410 3RD YEAR O&M								
3410. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3410.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3410.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3410.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3410.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3410.30 UTILITIES	12.00	MO	6,793,577	407,615	720,119	39,607	7,960,917	663409.73
3410.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3410.40 CHEMICALS	12.00	MO	109,075	6,545	11,562	636	127,817	10651.45
3410.45 DISPOSALS	12.00	MO	349,949	20,997	37,095	2,040	410,080	34173.37
3410.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3410.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL 3RD YEAR O&M	12.00	MO	8,899,135	533,948	943,308	51,882	10,428,273	869022.76
Scope Contingency	9.82	%					1,024,391	
SUBTOTAL							11,452,665	
Bid Contingency	9.67	%					1,107,105	
TOTAL INCL OWNER COSTS							12,559,770	
3415 4TH YEAR O&M								
3415. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3415.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3415.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3415.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3415.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3415.30 UTILITIES	12.00	MO	5,681,203	340,872	602,208	33,121	6,657,404	554783.68

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3415.40	CHEMICALS	12.00	MO	84,420	5,065	8,949	492	98,926	8243.82
3415.45	DISPOSALS	12.00	MO	343,324	20,599	36,392	2,002	402,317	33526.42
3415.49	SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
3415.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
3415.60	REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
TOTAL 4TH YEAR O&M		12.00	MO	7,786,691	467,201	825,389	45,396	9,124,679	760389.89
Scope Contingency		9.78	%					892,203	
SUBTOTAL								10,016,882	
Bid Contingency		9.62	%					963,527	
TOTAL INCL OWNER COSTS								10,980,409	
3420	5TH YEAR O&M								
3420. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3420.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3420.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3420.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3420.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3420.30	UTILITIES	12.00	MO	438,869	26,332	46,520	2,559	514,280	42856.64
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3420.40	CHEMICALS	12.00	MO	62,420	3,745	6,617	364	73,146	6095.47
3420.45	DISPOSALS	12.00	MO	333,254	19,995	35,325	1,943	390,517	32543.06
3420.49	SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3420.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL 5TH YEAR O&M		12.00	MO	2,388,204	143,292	253,150	13,923	2,798,569	233214.10
Scope Contingency		9.36	%					261,943	
SUBTOTAL								3,060,512	
Bid Contingency		8.95	%					273,850	
TOTAL INCL OWNER COSTS								3,334,362	
3425	6TH YEAR O&M								
3425. 5	GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3425.30	UTILITIES	12.00	MO	438,869	26,332	46,520	2,559	514,280	42856.64
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3425.40	CHEMICALS	12.00	MO	58,920	3,535	6,246	344	69,044	5753.69

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3425.45 DISPOSALS	12.00	MO	318,644	19,119	33,776	1,858	373,396	31116.36
3425.49 SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
3425.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL 6TH YEAR O&M	12.00	MO	2,370,094	142,206	251,230	13,818	2,777,347	231445.61
Scope Contingency	9.36	%					259,821	
SUBTOTAL							3,037,168	
Bid Contingency	8.94	%					271,515	
TOTAL INCL OWNER COSTS							3,308,683	
3430 7TH YEAR O&M								
3430. 5 GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68
3430.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
3430.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
3430.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
3430.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
3430.30 UTILITIES	12.00	MO	438,869	26,332	46,520	2,559	514,280	42856.64
3430.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
3430.40 CHEMICALS	12.00	MO	55,420	3,325	5,875	323	64,943	5411.90
3430.45 DISPOSALS	12.00	MO	317,034	19,022	33,606	1,848	371,510	30959.14
3430.49 SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
3430.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
3430.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
TOTAL 7TH YEAR O&M	12.00	MO	3,803,150	228,189	403,134	22,172	4,456,645	371387.06
Scope Contingency	9.60	%					427,751	
SUBTOTAL							4,884,395	
Bid Contingency	7.44	%					363,547	
TOTAL INCL OWNER COSTS							5,247,943	
3435 8TH YEAR O&M								
3435. 5 GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77
3435.49 SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
3435.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
TOTAL 8TH YEAR O&M	12.00	MO	95,242	5,715	10,096	555	111,608	9300.65
Scope Contingency	9.56	%					10,668	
SUBTOTAL							122,276	
Bid Contingency	5.00	%					6,114	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							128,390	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS								
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1.00	JOB	1,314,235	78,854	139,309	7,662	1,540,060	1540059.88
3300.05.02 ADMINISTRATION HOME OFFICE	1.00	JOB	400,201	24,012	42,421	2,333	468,967	468967.07
3300.05.03 PURCHASING	1.00	JOB	123,860	7,432	13,129	722	145,143	145142.86
3300.05.06 FIRST AID, FIRE, TRAFFIC, SECUR	1.00	JOB	136,647	8,199	14,485	797	160,127	160126.79
3300.05.07 HEALTH & SAFETY	1.00	JOB	72,883	4,373	7,726	425	85,407	85406.83
3300.05.09 TEMP CONSTRUCTION FACILITIES	1.00	JOB	118,810	7,129	12,594	693	139,225	139225.12
3300.05.10 PROJECT UTILITIES	1.00	JOB	18,902	1,134	2,004	110	22,150	22149.70
3300.05.15 PATENT FEES			100,000	6,000	10,600	583	117,183	
TOTAL GENERAL CONDITIONS	1.00	JOB	2,285,537	137,132	242,267	13,325	2,678,261	2678261.26
Scope Contingency	5.00	%					133,913	
SUBTOTAL							2,812,174	
Bid Contingency	10.00	%					281,217	
TOTAL INCL OWNER COSTS							3,093,392	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01 Construction Work Plan	1.00	EA	12,230	734	1,296	71	14,331	14331.01
3300.10.02 Contractors QC Management Plan	1.00	EA	7,302	438	774	43	8,556	8556.23
3300.10.03 Contractors Chem Quality Control	1.00	EA	13,774	826	1,460	80	16,141	16140.79
3300.10.05 Regulatory Compliance Plan/Updat	1.00	EA	38,950	2,337	4,129	227	45,643	45642.78
3300.10.06 Traffic Routing Plan	1.00	EA	1,979	119	210	12	2,319	2318.58
3300.10.07 Site Health and Safety Plan	1.00	EA	11,806	708	1,251	69	13,834	13834.16
3300.10.15 Performance Testing Plan	1.00	EA	10,723	643	1,137	63	12,566	12565.77
3300.10.41 Subcontracting Plan	1.00	EA	2,398	144	254	14	2,811	2810.52
3300.10.42 Environmental Protection Plan	1.00	EA	3,333	200	353	19	3,905	3905.48
3300.10.43 Correct/Emerg Conting Action Pln	1.00	EA	3,064	184	325	18	3,591	3590.96
TOTAL SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
Scope Contingency	5.00	%					6,185	
SUBTOTAL							129,881	
Bid Contingency	5.00	%					6,494	
TOTAL INCL OWNER COSTS							136,375	
3300.12 ENGINEERING								
3300.12.10 COMPLETION DESIGN - CIVIL	1.00	JOB	184,160	11,050	19,521	1,074	215,804	215804.21
3300.12.15 COMPLETION DESIGN - PROCESS	1.00	JOB	430,800	25,848	45,665	2,512	504,824	504824.36

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.12.20 COMPLETION DESIGN - ELECTRICAL	1.00	JOB	98,110	5,887	10,400	572	114,968	114968.24
3300.12.32 COMPLETION DESIGN - MECHANICAL	1.00	JOB	64,180	3,851	6,803	374	75,208	75208.05
3300.12.37 COMPLETE DESIGN - SPECIALTY SUB	1.00	JOB	800,000	48,000	84,800	4,664	937,464	937464.00
TOTAL ENGINEERING	1.00	JOB	1,607,917	96,475	170,439	9,374	1,884,205	1884205.38
Scope Contingency	10.00	%					188,421	
SUBTOTAL							2,072,626	
Bid Contingency	10.00	%					207,263	
TOTAL INCL OWNER COSTS							2,279,889	
3300.15 MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01 CLEAR SITE BRUSH	30.00	ACR	18,523	1,111	1,963	108	21,706	723.52
3300.15.02 MOBE EQUIP & FACILITIES	1.00	JOB	1,284	77	136	7	1,505	1504.60
3300.15.05 TEMPORARY FACILITIES	1.00	JOB	261,135	15,668	27,680	1,522	306,006	306006.01
3300.15.08 SIGNS, BARRICADES	1.00	JOB	79,554	4,773	8,433	464	93,223	93223.28
3300.15.10 GRAVEL CAP	22.20	ACR	506,719	30,403	53,712	2,954	593,789	26747.23
3300.15.15 ASPHALT CAP	4222.00	SY	93,922	5,635	9,956	548	110,061	26.07
3300.15.92 SURVEYS	1.00	JOB	29,000	1,740	3,074	169	33,983	33983.07
3300.15.97 MEETINGS	2.00	EA	11,435	686	1,212	67	13,400	6700.22
TOTAL MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	1,001,572	60,094	106,167	5,839	1,173,673	1173672.64
Scope Contingency	10.00	%					117,367	
SUBTOTAL							1,291,040	
Bid Contingency	10.00	%					129,104	
TOTAL INCL OWNER COSTS							1,420,144	
3300.20 TREATMENT SYSTEM CONSTRUCTION								
3300.20.01 TREATMENT PLANT BUILDING	1.00	JOB	468,394	28,104	49,650	2,731	548,878	548878.43
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	5,823,752	349,425	617,318	33,952	6,824,447	6824446.89
3300.20.07 WELL INSTRUMENTS/CONTROLS	1.00	JOB	2,956,051	177,363	313,341	17,234	3,463,989	3463989.06
3300.20.10 INSTALL WELLS	1.00	JOB	11,145,558	668,733	1,181,429	64,979	13,060,699	13060699.06
3300.20.15 PIPING	1.00	JOB	5,420,436	325,226	574,566	31,601	6,351,829	6351829.11
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	25,814,190	1,548,851	2,736,304	150,497	30,249,843	30249842.55
Scope Contingency	10.00	%					3,024,984	
SUBTOTAL							33,274,827	
Bid Contingency	10.00	%					3,327,483	
TOTAL INCL OWNER COSTS							36,602,309	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.25 START UP, TESTING, O&M PLAN								
3300.25. 5 O&M MANUAL	1.00	JOB	43,043	2,583	4,563	251	50,439	50438.70
3300.25.10 STARTUP/COMMISSION TREATMENT SYS	1.00	JOB	571,014	34,261	60,527	3,329	669,131	669131.31
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	614,057	36,843	65,090	3,580	719,570	719570.02
Scope Contingency	10.00	%					71,957	
SUBTOTAL							791,527	
Bid Contingency	10.00	%					79,153	
TOTAL INCL OWNER COSTS							870,680	
3300.30 DEMOBILIZATION								
3300.30.21 DEMOBILIZATION	1.00	JOB	14,171	850	1,502	83	16,606	16606.21
3300.30.22 REPORTS, CLOSEOUT	1.00	JOB	145,135	8,708	15,384	846	170,074	170073.78
TOTAL DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
Scope Contingency	10.00	%					18,668	
SUBTOTAL							205,348	
Bid Contingency	10.00	%					20,535	
TOTAL INCL OWNER COSTS							225,883	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS								
3400. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3400. 5.10 ERM SYSTEM OP/REPORTING	12.00	MO	346,424	20,785	36,721	2,020	405,950	33829.17
3400. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	581,909	34,915	61,682	3,393	681,898	56824.85
Scope Contingency	5.00	%					34,095	
SUBTOTAL							715,993	
Bid Contingency	5.00	%					35,800	
TOTAL INCL OWNER COSTS							751,793	
3400.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00	%					2,726	
SUBTOTAL							57,239	
Bid Contingency	5.00	%					2,862	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	TOTAL INCL OWNER COSTS							60,101	
3400.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3400.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3400.25	MAINTENANCE	12.00	MO	80,080	4,805	8,488	467	93,840	7820.01
	Scope Contingency	10.00	%					9,384	
	SUBTOTAL							103,224	
	Bid Contingency	10.00	%					10,322	
	TOTAL INCL OWNER COSTS							113,547	
3400.30	UTILITIES	12.00	MO	10,076,563	604,594	1,068,116	58,746	11,808,019	984001.57
	Scope Contingency	10.00	%					1,180,802	
	SUBTOTAL							12,988,821	
	Bid Contingency	10.00	%					1,298,882	
	TOTAL INCL OWNER COSTS							14,287,703	
3400.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3400.40	CHEMICALS	12.00	MO	131,825	7,910	13,973	769	154,476	12873.04
	Scope Contingency	10.00	%					15,448	
	SUBTOTAL							169,924	
	Bid Contingency	10.00	%					16,992	
	TOTAL INCL OWNER COSTS							186,917	

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3400.45 DISPOSALS							
3400.45. 5 SLUDGE	12.00 MO	42,000	2,520	4,452	245	49,217	4101.41
3400.45.10 CARBON (GAC, VAPOR PHASE)	12.00 MO	7,800	468	827	45	9,140	761.69
3400.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	22,540	1,352	2,389	131	26,413	2201.09
3400.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3400.45.25 OILY WASTE	12.00 MO	268,714	16,123	28,484	1,567	314,887	26240.57
3400.45.30 WASTE MISC COSTS	12.00 MO	14,000	840	1,484	82	16,406	1367.14
TOTAL DISPOSALS	12.00 MO	357,054	21,423	37,848	2,082	418,406	34867.19
Scope Contingency	10.00 %					41,841	
SUBTOTAL						460,247	
Bid Contingency	10.00 %					46,025	
TOTAL INCL OWNER COSTS						506,272	
3400.49 SAMPLING & ANALYSIS							
3400.49. 5 PERFORMANCE MONITORING	12.00 MO	15,067	904	1,597	88	17,656	1471.36
3400.49.10 COMPLIANCE MONITORING	12.00 MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00 MO	210,215	12,613	22,283	1,226	246,336	20528.02
Scope Contingency	10.00 %					24,634	
SUBTOTAL						270,970	
Bid Contingency	5.00 %					13,548	
TOTAL INCL OWNER COSTS						284,518	
3400.55 QC & ANALYTICAL DATA VALIDATION							
3400.55. 5 DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00 %					1,357	
SUBTOTAL						28,504	
Bid Contingency	5.00 %					1,425	
TOTAL INCL OWNER COSTS						29,929	

3405 2ND YEAR O&M

3405. 5 GENERAL CONDITIONS

		QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3405. 5.05	OFFSITE ADMINISTRATIVE COSTS	12.00 MO	104,085	6,245	11,033	607	121,970	10164.14
3405. 5.10	ERH SYSTEM OP/REPORTING	12.00 MO	346,424	20,785	36,721	2,020	405,950	33829.17
3405. 5.15	SITE SECURITY	12.00 MO	131,400	7,884	13,928	766	153,978	12831.54
	TOTAL GENERAL CONDITIONS	12.00 MO	581,909	34,915	61,682	3,393	681,898	56824.85
	Scope Contingency	5.00 %					34,095	
	SUBTOTAL						715,993	
	Bid Contingency	5.00 %					35,800	
	TOTAL INCL OWNER COSTS						751,793	
3405.10	SITE FACILITIES	12.00 MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00 %					2,726	
	SUBTOTAL						57,239	
	Bid Contingency	5.00 %					2,862	
	TOTAL INCL OWNER COSTS						60,101	
3405.15	HEALTH & SAFETY	12.00 MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00 %					555	
	SUBTOTAL						11,664	
	Bid Contingency	5.00 %					583	
	TOTAL INCL OWNER COSTS						12,248	
3405.20	MATERIALS & SUPPLIES	12.00 MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00 %					422	
	SUBTOTAL						4,640	
	Bid Contingency	10.00 %					464	
	TOTAL INCL OWNER COSTS						5,104	
3405.25	MAINTENANCE	12.00 MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00 %					8,212	
	SUBTOTAL						90,334	
	Bid Contingency	10.00 %					9,033	
	TOTAL INCL OWNER COSTS						99,367	
3405.30	UTILITIES	12.00 MO	8,889,625	533,377	942,300	51,827	10,417,129	868094.08
	Scope Contingency	10.00 %					1,041,713	
	SUBTOTAL						11,458,842	
	Bid Contingency	10.00 %					1,145,884	

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS						12,604,726	
3405.35 SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
Scope Contingency	10.00 %					113,252	
SUBTOTAL						1,245,768	
Bid Contingency	10.00 %					124,577	
TOTAL INCL OWNER COSTS						1,370,344	
3405.40 CHEMICALS	12.00 MO	124,825	7,490	13,231	728	146,274	12189.47
Scope Contingency	10.00 %					14,627	
SUBTOTAL						160,901	
Bid Contingency	10.00 %					16,090	
TOTAL INCL OWNER COSTS						176,991	
3405.45 DISPOSALS							
3405.45. 5 SLUDGE	12.00 MO	42,000	2,520	4,452	245	49,217	4101.41
3405.45.10 CARBON (GAC, VAPOR PHASE)	12.00 MO	7,800	468	827	45	9,140	761.69
3405.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	19,320	1,159	2,048	113	22,640	1886.65
3405.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3405.45.25 OILY WASTE	12.00 MO	268,714	16,123	28,484	1,567	314,887	26240.57
3405.45.30 WASTE MISC COSTS	12.00 MO	17,360	1,042	1,840	101	20,343	1695.25
TOTAL DISPOSALS	12.00 MO	357,194	21,432	37,863	2,082	418,570	34880.86
Scope Contingency	10.00 %					41,857	
SUBTOTAL						460,427	
Bid Contingency	10.00 %					46,043	
TOTAL INCL OWNER COSTS						506,470	
3405.49 SAMPLING & ANALYSIS							
3405.49. 5 PERFORMANCE MONITORING	12.00 MO	96,605	5,796	10,240	563	113,205	9433.75
3405.49.10 COMPLIANCE MONITORING	12.00 MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00 MO	291,753	17,505	30,926	1,701	341,885	28490.41
Scope Contingency	10.00 %					34,188	
SUBTOTAL						376,073	
Bid Contingency	5.00 %					18,804	

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS						394,877	
3405.55 QC & ANALYTICAL DATA VALIDATION							
3405.55. 5 DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00 %					1,357	
SUBTOTAL						28,504	
Bid Contingency	5.00 %					1,425	
TOTAL INCL OWNER COSTS						29,929	
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS	1.00 JOB	37,452	2,247	3,970	218	43,887	43887.38
Scope Contingency	10.00 %					4,389	
SUBTOTAL						48,276	
Bid Contingency	10.00 %					4,828	
TOTAL INCL OWNER COSTS						53,104	
3410 3RD YEAR O&M							
3410. 5 GENERAL CONDITIONS							
3410. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00 MO	104,085	6,245	11,033	607	121,970	10164.14
3410. 5.15 SITE SECURITY	12.00 MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00 MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00 %					13,797	
SUBTOTAL						289,746	
Bid Contingency	5.00 %					14,487	
TOTAL INCL OWNER COSTS						304,233	
3410.10 SITE FACILITIES	12.00 MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00 %					2,726	
SUBTOTAL						57,239	
Bid Contingency	5.00 %					2,862	
TOTAL INCL OWNER COSTS						60,101	
3410.15 HEALTH & SAFETY	12.00 MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00 %					555	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3410.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3410.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3410.30	UTILITIES	12.00	MO	6,793,577	407,615	720,119	39,607	7,960,917	663409.73
	Scope Contingency	10.00	%					796,092	
	SUBTOTAL							8,757,008	
	Bid Contingency	10.00	%					875,701	
	TOTAL INCL OWNER COSTS							9,632,709	
3410.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3410.40	CHEMICALS	12.00	MO	109,075	6,545	11,562	636	127,817	10651.45
	Scope Contingency	10.00	%					12,782	
	SUBTOTAL							140,599	
	Bid Contingency	10.00	%					14,060	
	TOTAL INCL OWNER COSTS							154,659	
3410.45	DISPOSALS								
3410.45. 5	SLUDGE	12.00	MO	42,000	2,520	4,452	245	49,217	4101.41
3410.45.10	CARBON (GAC, VAPOR PHASE)	12.00	MO	7,800	468	827	45	9,140	761.69

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3410.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	12,075	725	1,280	70	14,150	1179.15
3410.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3410.45.25 OILY WASTE	12.00 MO	268,714	16,123	28,484	1,567	314,887	26240.57
3410.45.30 WASTE MISC COSTS	12.00 MO	17,360	1,042	1,840	101	20,343	1695.25
TOTAL DISPOSALS	12.00 MO	349,949	20,997	37,095	2,040	410,080	34173.37
Scope Contingency	10.00 %					41,008	
SUBTOTAL						451,088	
Bid Contingency	10.00 %					45,109	
TOTAL INCL OWNER COSTS						496,197	
3410.49 SAMPLING & ANALYSIS							
3410.49. 5 PERFORMANCE MONITORING	12.00 MO	96,605	5,796	10,240	563	113,205	9433.75
3410.49.10 COMPLIANCE MONITORING	12.00 MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00 MO	291,753	17,505	30,926	1,701	341,885	28490.41
Scope Contingency	10.00 %					34,188	
SUBTOTAL						376,073	
Bid Contingency	5.00 %					18,804	
TOTAL INCL OWNER COSTS						394,877	
3410.55 QC & ANALYTICAL DATA VALIDATION							
3410.55. 5 DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00 %					1,357	
SUBTOTAL						28,504	
Bid Contingency	5.00 %					1,425	
TOTAL INCL OWNER COSTS						29,929	
3415 4TH YEAR O&M							
3415. 5 GENERAL CONDITIONS							
3415. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00 MO	104,085	6,245	11,033	607	121,970	10164.14
3415. 5.15 SITE SECURITY	12.00 MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00 MO	235,485	14,129	24,961	1,373	275,948	22995.68

		QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00 %					13,797	
	SUBTOTAL						289,746	
	Bid Contingency	5.00 %					14,487	
	TOTAL INCL OWNER COSTS						304,233	
3415.10	SITE FACILITIES	12.00 MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00 %					2,726	
	SUBTOTAL						57,239	
	Bid Contingency	5.00 %					2,862	
	TOTAL INCL OWNER COSTS						60,101	
3415.15	HEALTH & SAFETY	12.00 MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00 %					555	
	SUBTOTAL						11,664	
	Bid Contingency	5.00 %					583	
	TOTAL INCL OWNER COSTS						12,248	
3415.20	MATERIALS & SUPPLIES	12.00 MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00 %					422	
	SUBTOTAL						4,640	
	Bid Contingency	10.00 %					464	
	TOTAL INCL OWNER COSTS						5,104	
3415.25	MAINTENANCE	12.00 MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00 %					8,212	
	SUBTOTAL						90,334	
	Bid Contingency	10.00 %					9,033	
	TOTAL INCL OWNER COSTS						99,367	
3415.30	UTILITIES	12.00 MO	5,681,203	340,872	602,208	33,121	6,657,404	554783.68
	Scope Contingency	10.00 %					665,740	
	SUBTOTAL						7,323,145	
	Bid Contingency	10.00 %					732,314	
	TOTAL INCL OWNER COSTS						8,055,459	
3415.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00 %					113,252	
	SUBTOTAL						1,245,768	

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Bid Contingency	10.00 %					124,577	
TOTAL INCL OWNER COSTS						1,370,344	
3415.40 CHEMICALS	12.00 MO	84,420	5,065	8,949	492	98,926	8243.82
Scope Contingency	10.00 %					9,893	
SUBTOTAL						108,818	
Bid Contingency	10.00 %					10,882	
TOTAL INCL OWNER COSTS						119,700	
3415.45 DISPOSALS							
3415.45. 5 SLUDGE	12.00 MO	42,000	2,520	4,452	245	49,217	4101.41
3415.45.10 CARBON (GAC, VAPOR PHASE)	12.00 MO	5,200	312	551	30	6,094	507.79
3415.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	8,050	483	853	47	9,433	786.10
3415.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3415.45.25 OILY WASTE	12.00 MO	268,714	16,123	28,484	1,567	314,887	26240.57
3415.45.30 WASTE MISC COSTS	12.00 MO	17,360	1,042	1,840	101	20,343	1695.25
TOTAL DISPOSALS	12.00 MO	343,324	20,599	36,392	2,002	402,317	33526.42
Scope Contingency	10.00 %					40,232	
SUBTOTAL						442,549	
Bid Contingency	10.00 %					44,255	
TOTAL INCL OWNER COSTS						486,804	
3415.49 SAMPLING & ANALYSIS							
3415.49. 5 PERFORMANCE MONITORING	12.00 MO	96,605	5,796	10,240	563	113,205	9433.75
3415.49.10 COMPLIANCE MONITORING	12.00 MO	195,148	11,709	20,686	1,138	228,680	19056.66
TOTAL SAMPLING & ANALYSIS	12.00 MO	291,753	17,505	30,926	1,701	341,885	28490.41
Scope Contingency	10.00 %					34,188	
SUBTOTAL						376,073	
Bid Contingency	5.00 %					18,804	
TOTAL INCL OWNER COSTS						394,877	
3415.55 QC & ANALYTICAL DATA VALIDATION							
3415.55. 5 DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	23,166	1,390	2,456	135	27,147	2262.22
Scope Contingency	5.00 %					1,357	
SUBTOTAL						28,504	
Bid Contingency	5.00 %					1,425	
TOTAL INCL OWNER COSTS						29,929	
3415.60 REMOVE/DEMO STEAM EQUIPMENT							
3415.60. 5 DEMOLITION/REMOVAL EQUIPMENT	1.00 JOB	21,210	1,273	2,248	124	24,855	24854.69
3415.60.10 DISPOSALS	1.00 JOB	10,000	600	1,060	58	11,718	11718.30
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00 MO	31,210	1,873	3,308	182	36,573	3047.75
Scope Contingency	5.00 %					1,829	
SUBTOTAL						38,402	
Bid Contingency	10.00 %					3,840	
TOTAL INCL OWNER COSTS						42,242	
3420 5TH YEAR O&M							
3420. 5 GENERAL CONDITIONS							
3420. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00 MO	104,085	6,245	11,033	607	121,970	10164.14
3420. 5.15 SITE SECURITY	12.00 MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00 MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00 %					13,797	
SUBTOTAL						289,746	
Bid Contingency	5.00 %					14,487	
TOTAL INCL OWNER COSTS						304,233	
3420.10 SITE FACILITIES	12.00 MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00 %					2,726	
SUBTOTAL						57,239	
Bid Contingency	5.00 %					2,862	
TOTAL INCL OWNER COSTS						60,101	
3420.15 HEALTH & SAFETY	12.00 MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00 %					555	

** PROJECT INDIRECT SUMMARY - SUBSYSTM **

		QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	SUBTOTAL						11,664	
	Bid Contingency	5.00 %					583	
	TOTAL INCL OWNER COSTS						12,248	
3420.20	MATERIALS & SUPPLIES	12.00 MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00 %					422	
	SUBTOTAL						4,640	
	Bid Contingency	10.00 %					464	
	TOTAL INCL OWNER COSTS						5,104	
3420.25	MAINTENANCE	12.00 MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00 %					8,212	
	SUBTOTAL						90,334	
	Bid Contingency	10.00 %					9,033	
	TOTAL INCL OWNER COSTS						99,367	
3420.30	UTILITIES	12.00 MO	438,869	26,332	46,520	2,559	514,280	42856.64
	Scope Contingency	10.00 %					51,428	
	SUBTOTAL						565,708	
	Bid Contingency	10.00 %					56,571	
	TOTAL INCL OWNER COSTS						622,278	
3420.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00 %					113,252	
	SUBTOTAL						1,245,768	
	Bid Contingency	10.00 %					124,577	
	TOTAL INCL OWNER COSTS						1,370,344	
3420.40	CHEMICALS	12.00 MO	62,420	3,745	6,617	364	73,146	6095.47
	Scope Contingency	10.00 %					7,315	
	SUBTOTAL						80,460	
	Bid Contingency	10.00 %					8,046	
	TOTAL INCL OWNER COSTS						88,506	
3420.45	DISPOSALS							
3420.45. 5	SLUDGE	12.00 MO	42,000	2,520	4,452	245	49,217	4101.41
3420.45.15	CARBON (GAC, LIQUID PHASE)	12.00 MO	4,830	290	512	28	5,660	471.66

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3420.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3420.45.25 OILY WASTE	12.00	MO	268,714	16,123	28,484	1,567	314,887	26240.57
3420.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	333,254	19,995	35,325	1,943	390,517	32543.06
Scope Contingency	10.00	%					39,052	
SUBTOTAL							429,568	
Bid Contingency	10.00	%					42,957	
TOTAL INCL OWNER COSTS							472,525	
3420.49 SAMPLING & ANALYSIS								
3420.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3420.49.10 COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00	%					24,349	
SUBTOTAL							267,844	
Bid Contingency	5.00	%					13,392	
TOTAL INCL OWNER COSTS							281,236	
3420.55 QC & ANALYTICAL DATA VALIDATION								
3420.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00	%					835	
SUBTOTAL							17,541	
Bid Contingency	5.00	%					877	
TOTAL INCL OWNER COSTS							18,418	
3425 6TH YEAR O&M								
3425. 5 GENERAL CONDITIONS								
3425. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
3425. 5.15 SITE SECURITY	12.00	MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00	MO	235,485	14,129	24,961	1,373	275,948	22995.68

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00	%					13,797	
	SUBTOTAL							289,746	
	Bid Contingency	5.00	%					14,487	
	TOTAL INCL OWNER COSTS							304,233	
3425.10	SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
	Scope Contingency	5.00	%					2,726	
	SUBTOTAL							57,239	
	Bid Contingency	5.00	%					2,862	
	TOTAL INCL OWNER COSTS							60,101	
3425.15	HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
	Scope Contingency	5.00	%					555	
	SUBTOTAL							11,664	
	Bid Contingency	5.00	%					583	
	TOTAL INCL OWNER COSTS							12,248	
3425.20	MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
	Scope Contingency	10.00	%					422	
	SUBTOTAL							4,640	
	Bid Contingency	10.00	%					464	
	TOTAL INCL OWNER COSTS							5,104	
3425.25	MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
	Scope Contingency	10.00	%					8,212	
	SUBTOTAL							90,334	
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3425.30	UTILITIES	12.00	MO	438,869	26,332	46,520	2,559	514,280	42856.64
	Scope Contingency	10.00	%					51,428	
	SUBTOTAL							565,708	
	Bid Contingency	10.00	%					56,571	
	TOTAL INCL OWNER COSTS							622,278	
3425.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Bid Contingency	10.00	%					124,577	
TOTAL INCL OWNER COSTS							1,370,344	
3425.40 CHEMICALS	12.00	MO	58,920	3,535	6,246	344	69,044	5753.69
Scope Contingency	10.00	%					6,904	
SUBTOTAL							75,949	
Bid Contingency	10.00	%					7,595	
TOTAL INCL OWNER COSTS							83,544	
3425.45 DISPOSALS								
3425.45. 5 SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3425.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	3,220	193	341	19	3,773	314.44
3425.45.20 PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3425.45.25 OILY WASTE	12.00	MO	268,714	16,123	28,484	1,567	314,887	26240.57
3425.45.30 WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
TOTAL DISPOSALS	12.00	MO	318,644	19,119	33,776	1,858	373,396	31116.36
Scope Contingency	10.00	%					37,340	
SUBTOTAL							410,736	
Bid Contingency	10.00	%					41,074	
TOTAL INCL OWNER COSTS							451,809	
3425.49 SAMPLING & ANALYSIS								
3425.49. 5 PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3425.49.10 COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85
TOTAL SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
Scope Contingency	10.00	%					24,349	
SUBTOTAL							267,844	
Bid Contingency	5.00	%					13,392	
TOTAL INCL OWNER COSTS							281,236	
3425.55 QC & ANALYTICAL DATA VALIDATION								
3425.55. 5 DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00 %					835	
SUBTOTAL						17,541	
Bid Contingency	5.00 %					877	
TOTAL INCL OWNER COSTS						18,418	
3430 7TH YEAR O&M							
3430. 5 GENERAL CONDITIONS							
3430. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00 MO	104,085	6,245	11,033	607	121,970	10164.14
3430. 5.15 SITE SECURITY	12.00 MO	131,400	7,884	13,928	766	153,978	12831.54
TOTAL GENERAL CONDITIONS	12.00 MO	235,485	14,129	24,961	1,373	275,948	22995.68
Scope Contingency	5.00 %					13,797	
SUBTOTAL						289,746	
Bid Contingency	5.00 %					14,487	
TOTAL INCL OWNER COSTS						304,233	
3430.10 SITE FACILITIES	12.00 MO	46,520	2,791	4,931	271	54,514	4542.79
Scope Contingency	5.00 %					2,726	
SUBTOTAL						57,239	
Bid Contingency	5.00 %					2,862	
TOTAL INCL OWNER COSTS						60,101	
3430.15 HEALTH & SAFETY	12.00 MO	9,480	569	1,005	55	11,109	925.75
Scope Contingency	5.00 %					555	
SUBTOTAL						11,664	
Bid Contingency	5.00 %					583	
TOTAL INCL OWNER COSTS						12,248	
3430.20 MATERIALS & SUPPLIES	12.00 MO	3,600	216	382	21	4,219	351.55
Scope Contingency	10.00 %					422	
SUBTOTAL						4,640	
Bid Contingency	10.00 %					464	
TOTAL INCL OWNER COSTS						5,104	
3430.25 MAINTENANCE	12.00 MO	70,080	4,205	7,428	409	82,122	6843.49
Scope Contingency	10.00 %					8,212	
SUBTOTAL						90,334	

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Bid Contingency	10.00	%					9,033	
	TOTAL INCL OWNER COSTS							99,367	
3430.30	UTILITIES	12.00	MO	438,869	26,332	46,520	2,559	514,280	42856.64
	Scope Contingency	10.00	%					51,428	
	SUBTOTAL							565,708	
	Bid Contingency	10.00	%					56,571	
	TOTAL INCL OWNER COSTS							622,278	
3430.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
	Scope Contingency	10.00	%					113,252	
	SUBTOTAL							1,245,768	
	Bid Contingency	10.00	%					124,577	
	TOTAL INCL OWNER COSTS							1,370,344	
3430.40	CHEMICALS	12.00	MO	55,420	3,325	5,875	323	64,943	5411.90
	Scope Contingency	10.00	%					6,494	
	SUBTOTAL							71,437	
	Bid Contingency	10.00	%					7,144	
	TOTAL INCL OWNER COSTS							78,581	
3430.45	DISPOSALS								
3430.45. 5	SLUDGE	12.00	MO	29,000	1,740	3,074	169	33,983	2831.92
3430.45.15	CARBON (GAC, LIQUID PHASE)	12.00	MO	1,610	97	171	9	1,887	157.22
3430.45.20	PPE & MISC	12.00	MO	2,000	120	212	12	2,344	195.31
3430.45.25	OILY WASTE	12.00	MO	268,714	16,123	28,484	1,567	314,887	26240.57
3430.45.30	WASTE MISC COSTS	12.00	MO	15,710	943	1,665	92	18,409	1534.12
	TOTAL DISPOSALS	12.00	MO	317,034	19,022	33,606	1,848	371,510	30959.14
	Scope Contingency	10.00	%					37,151	
	SUBTOTAL							408,661	
	Bid Contingency	10.00	%					40,866	
	TOTAL INCL OWNER COSTS							449,527	
3430.49	SAMPLING & ANALYSIS								
3430.49. 5	PERFORMANCE MONITORING	12.00	MO	15,067	904	1,597	88	17,656	1471.36
3430.49.10	COMPLIANCE MONITORING	12.00	MO	192,723	11,563	20,429	1,124	225,838	18819.85

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3430.49.15 CONFIRMATIONAL SAMPLING		71,190	4,271	7,546	415	83,423	
TOTAL SAMPLING & ANALYSIS	12.00 MO	278,980	16,739	29,572	1,626	326,917	27243.09
Scope Contingency	10.00 %					32,692	
SUBTOTAL						359,609	
Bid Contingency	5.00 %					17,980	
TOTAL INCL OWNER COSTS						377,589	
3430.55 QC & ANALYTICAL DATA VALIDATION							
3430.55. 5 DATA VALIDATION	12.00 MO	14,256	855	1,511	83	16,706	1392.13
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	14,256	855	1,511	83	16,706	1392.13
Scope Contingency	5.00 %					835	
SUBTOTAL						17,541	
Bid Contingency	5.00 %					877	
TOTAL INCL OWNER COSTS						18,418	
3430.60 DEMO/REMOVAL TREATMENT SYSTEM							
3430.60.02 GENERAL CONDITIONS	1.00 JOB	304,080	18,245	32,232	1,773	356,330	356329.68
3430.60.05 DEMO GWTP	1.00 JOB	85,020	5,101	9,012	496	99,629	99628.83
3430.60.10 DEMO PIPING	1.00 JOB	116,770	7,006	12,378	681	136,834	136834.50
3430.60.15 PLUG & ABANDON WELLS	1.00 JOB	261,106	15,666	27,677	1,522	305,972	305971.84
3430.60.20 DISPOSALS	1.00 JOB	600,000	36,000	63,600	3,498	703,098	703098.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00 MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
Scope Contingency	10.00 %					160,186	
SUBTOTAL						1,762,049	
Bid Contingency	5.00 %					88,102	
TOTAL INCL OWNER COSTS						1,850,152	
3435 8TH YEAR O&M							
3435. 5 GENERAL CONDITIONS							
3435. 5.05 OFFSITE ADMINISTRATIVE COSTS	12.00 MO	6,029	362	639	35	7,065	588.77
TOTAL GENERAL CONDITIONS	12.00 MO	6,029	362	639	35	7,065	588.77

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	5.00 %					353	
SUBTOTAL						7,418	
Bid Contingency	5.00 %					371	
TOTAL INCL OWNER COSTS						7,789	
3435.49 SAMPLING & ANALYSIS							
3435.49.10 COMPLIANCE MONITORING	12.00 MO	86,837	5,210	9,205	506	101,758	8479.87
TOTAL SAMPLING & ANALYSIS	12.00 MO	86,837	5,210	9,205	506	101,758	8479.87
Scope Contingency	10.00 %					10,176	
SUBTOTAL						111,934	
Bid Contingency	5.00 %					5,597	
TOTAL INCL OWNER COSTS						117,531	
3435.55 QC & ANALYTICAL DATA VALIDATION							
3435.55. 5 DATA VALIDATION	12.00 MO	2,376	143	252	14	2,784	232.02
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	2,376	143	252	14	2,784	232.02
Scope Contingency	5.00 %					139	
SUBTOTAL						2,923	
Bid Contingency	5.00 %					146	
TOTAL INCL OWNER COSTS						3,070	

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300. CAPITAL COSTS								
3300.05. GENERAL CONDITIONS								
3300.05.01. FIELD SUPERVISION & MANAGEMENT								
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	3400.00 HR	227,171	0	0	0	0	227,171	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	3400.00 HR	147,798	0	0	0	0	147,798	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	3400.00 HR	180,642	0	0	0	0	180,642	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	3400.00 HR	65,688	0	0	0	0	65,688	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	3400.00 HR	125,902	0	0	0	0	125,902	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	3400.00 HR	147,798	0	0	0	0	147,798	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	3400.00 HR	174,041	0	0	0	0	174,041	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	6800.00 HR	0	37,400	0	0	0	37,400	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	54.00 MO	0	0	0	0	54,000	54,000	1000.00
for 18 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	2470.00 DAY	0	0	0	0	70,395	70,395	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	120.00 EA	0	0	0	0	60,000	60,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	120.00 EA	0	0	0	0	2,400	2,400	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	60000 MI	0	0	0	0	21,000	21,000	0.35

3300.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	1,069,040	37,400	0	0	207,795	1,314,235	1314234.90
3300.05.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	520.00	HR	53,768	0	0	0	0	53,768	103.40
USR AA Prin. Engineer/Scientist I;			91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	600.00	HR	54,780	0	0	0	0	54,780	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	1250.00	HR	48,125	0	0	0	0	48,125	38.50
USR AA Engineer/Scientist IV -			59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	2400.00	HR	142,560	0	0	0	0	142,560	59.40
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	312.00	HR	32,261	0	0	0	0	32,261	103.40
Health and Safety Manager									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	312.00	HR	32,261	0	0	0	0	32,261	103.40
gr									
USR AA Mileage on Personal Car Pjm			0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	41600	MI	0	0	0	0	12,896	12,896	0.31
s*									
USR AA Lodging; three mo for PjM plu			0.00	0.00	0.00	0.00	80.00	80.00	
s	150.00	DAY	0	0	0	0	12,000	12,000	80.00
additional visits during									
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	150.00	DAY	0	0	0	0	5,700	5,700	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	10.00	EA	0	0	0	0	5,000	5,000	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	10.00	DAY	0	0	0	0	450	450	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	20.00	EA	0	0	0	0	400	400	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	363,755	0	0	0	36,446	400,201	400200.60

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.03. PURCHASING								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	1600.00 HR	116,160	0	0	0	0	116,160	72.60
USR AA Secretary/Clerical IV Home		38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	200.00 HR	7,700	0	0	0	0	7,700	38.50
TOTAL PURCHASING	1.00 JOB	123,860	0	0	0	0	123,860	123860.00
3300.05.06. FIRST AID, FIRE, TRAFFIC, SECUR								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S		56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00 EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower		145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No	1.00 EA	145	1	123	0	0	269	269.19
Additional Copper Piping Etc.								
HTW AA Eye Wash Bowl		126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No	4.00 EA	508	4	661	0	0	1,173	293.21
Additional Copper Piping Etc.								
HTW AA First Aid Kit		0.00	0.00	75.00	0.00	0.00	75.00	
	16.00 EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher		0.00	0.00	150.00	0.00	0.00	150.00	
	2.00 EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	1,773	15	3,458	131,400	0	136,647	136646.78
3300.05.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	40.00 DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	100.00 DAY	0	0	1,200	0	0	1,200	12.00
USR AA Install/Decon Personnel Decon		192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00 LS	192	1	250	0	0	443	443.30

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	18.00 MO	0	14,400	0	0	0	14,400	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	18.00 MO	0	6,300	0	0	0	6,300	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	18.00 MO	0	7,650	0	0	0	7,650	425.00
USR AA Labor Allowance for Site Specific Training		120.00	0.00	0.00	0.00	0.00	120.00	
	60.00 EA	7,200	0	0	0	0	7,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	60.00 EA	12,000	0	0	0	0	12,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	60.00 EA	0	0	0	21,000	0	21,000	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	19,392	28,351	4,140	21,000	0	72,883	72883.30
3300.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	18.00 MO	0	0	0	0	1,350	1,350	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	18.00 MO	0	0	0	0	7,200	7,200	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	18.00 MO	0	0	0	0	3,600	3,600	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	36.00 MO	0	0	0	0	3,060	3,060	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	18.00 MO	0	0	7,200	0	0	7,200	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	18.00 MO	0	10,800	0	0	0	10,800	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	18.00 MO	0	9,000	0	0	0	9,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	18.00 MO	0	1,800	0	0	0	1,800	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	18.00 MO	0	0	0	0	900	900	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	6.00 EA	0	18,000	0	0	0	18,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	3.00 EA	0	0	0	1,800	0	1,800	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	18.00 MO	0	0	0	3,600	0	3,600	200.00
USR AA COE Software, Primavera Suretrack		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 EA	0	0	500	0	0	500	500.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 EA	0	0	0	10,000	0	10,000	10000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 EA	0	0	0	5,000	0	5,000	5000.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	2.00 EA	0	0	0	10,000	0	10,000	5000.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	44,400	20,700	34,000	19,710	118,810	118810.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	18.00 MO	0	0	0	0	9,000	9,000	500.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	18.00 MO	0	0	0	0	8,100	8,100	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	18.00 MO	0	0	0	1,800	2	1,802	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	1,800	17,102	18,902	18901.80
3300.05.15. PATENT FEES								
USR AA Patent Fee Allowance		0.00	0.00	0.00	100000.00	0.00	100000.00	
	1.00 LS	0	0	0	100,000	0	100,000	100000.00
TOTAL PATENT FEES		0	0	0	100,000	0	100,000	
TOTAL GENERAL CONDITIONS	1.00 JOB	1,577,820	110,166	28,298	288,200	281,053	2,285,537	2285537.37

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10. SUBMITTALS/IMPLEMENTATION PLANS									
3300.10.01. Construction Work Plan									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	2.00	HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	24.00	HR	924	0	0	0	0	924	38.50
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	60.00	HR	5,082	0	0	0	0	5,082	84.70
USR AA Senior Engineer/Scientist I -			67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Response to Comments	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
TOTAL Construction Work Plan	1.00	EA	10,930	0	0	100	1,200	12,230	12229.60
3300.10.02. Contractors QC Management Plan									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	48.00	HR	2,851	0	0	0	0	2,851	59.40
USR AA Engineer/Scientist IV; Respon			59.40	0.00	0.00	0.00	0.00	59.40	
se	20.00	HR	1,188	0	0	0	0	1,188	59.40
to Comments									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Contractors QC Management Pla	1.00 EA	6,002	0	0	100	1,200	7,302	7301.60

3300.10.03. Contractors Chem Quality Control
Includes Contractors CQCMP, SAP, FSP, QAPP, Groundwater SAP, Process Liquid SAP.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA Senior Engineer/Scientist II; Project Chemist		72.60	0.00	0.00	0.00	0.00	72.60	
	100.00 HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist II; Project Chemist; Response to comments.		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors Chem Quality Cont	1.00 EA	12,474	0	0	100	1,200	13,774	13774.00

3300.10.05. Regulatory Compliance Plan/Updat
This work includes developing plan, quarterly updates to the plan for 8 quarters, and submitting permit/permit equivalency applications to all relevant federal, state and local agencies.

Permits (equivalencies) building, excavation, utility crossings, well, air emissions, Erosion Control, Stormwater, Electrical, Local permits are anticipated.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	120.00 HR	10,164	0	0	0	0	10,164	84.70
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA Permit Charges Allowance		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.30	0.30	
	880.00	MI	0	0	0	0	264	264	0.30
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	4.00	DAY	0	0	0	0	152	152	38.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Regulatory Compliance Plan/Up	1.00	EA	36,234	0	0	100	2,616	38,950	38950.00
3300.10.06. Traffic Routing Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	24.00	HR	1,426	0	0	0	0	1,426	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	10.00	10.00	
	24.00	EA	0	0	0	0	240	240	10.00
USR AA Mail			0.00	0.00	0.00	5.00	0.00	5.00	
	1.00	EA	0	0	0	5	0	5	5.00
TOTAL Traffic Routing Plan	1.00	EA	1,734	0	0	5	240	1,979	1978.60
3300.10.07. Site Health and Safety Plan Includes Air Monitoring Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	120.00	HR	7,128	0	0	0	0	7,128	59.40
USR AA Engineer/Scientist IV; Respon d to Comments	32.00	HR	59.40 1,901	0.00 0	0.00 0	0.00 0	0.00 0	59.40 1,901	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Senior Engineer/Scientist I - Draftsman	8.00	HR	67.10 537	0.00 0	0.00 0	0.00 0	0.00 0	67.10 537	67.10
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
TOTAL Site Health and Safety Plan	1.00	EA	11,106	0	0	100	600	11,806	11805.60
3300.10.15. Performance Testing Plan Source testing, Boiler and Emissions Control System.									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Senior Engineer/Scientist I; Respond to Comments			67.10	0.00	0.00	0.00	0.00	67.10	
	16.00	HR	1,074	0	0	0	0	1,074	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Performance Testing Plan	1.00	EA	9,473	0	0	50	1,200	10,723	10723.20
3300.10.41. Subcontracting Plan									
USR AA Principal Engineer/Scientist I			103.40	0.00	0.00	0.00	0.00	103.40	
	4.00	HR	414	0	0	0	0	414	103.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA Senior Engineer/Scientist II; Site Superintendant			72.60	0.00	0.00	0.00	0.00	72.60	
	8.00	HR	581	0	0	0	0	581	72.60
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Subcontracting Plan	1.00	EA	1,148	0	0	50	1,200	2,398	2398.40
3300.10.42. Environmental Protection Plan									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	16.00	HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	4.00	HR	238	0	0	0	0	238	59.40
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	8.00	HR	537	0	0	0	0	537	67.10
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Environmental Protection Plan	1.00	EA	2,033	0	0	100	1,200	3,333	3332.80
3300.10.43. Correct/Emerg Conting Action Pln									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	16.00	HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	4.00	HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	4.00	HR	268	0	0	0	0	268	67.10
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Correct/Emerg Conting Action	1.00	EA	1,764	0	0	100	1,200	3,064	3064.40
TOTAL SUBMITTALS/IMPLEMENTATION PLA	1.00	JOB	92,897	0	0	805	11,856	105,558	105558.20

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.12. ENGINEERING								
3300.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, steam, and gas lines, drainage, roads and parking.								
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	200.00 HR	15,840	0	0	0	0	15,840	79.20
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	200.00 HR	20,680	0	0	0	0	20,680	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	800.00 HR	58,080	0	0	0	0	58,080	72.60
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	1200.00 HR	50,160	0	0	0	0	50,160	41.80
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	800.00 HR	26,400	0	0	0	0	26,400	33.00
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00 EA	0	0	0	3,000	0	3,000	3.00
TOTAL COMPLETION DESIGN - CIVIL	1.00 JOB	171,160	0	0	3,000	10,000	184,160	184160.00
3300.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	1000.00 HR	103,400	0	0	0	0	103,400	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	2000.00 HR	83,600	0	0	0	0	83,600	41.80
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	2000.00 HR	169,400	0	0	0	0	169,400	84.70

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	1000.00 HR	48,400	0	0	0	0	48,400	48.40
USR AA ODC's		0.00	0.00	0.00	0.00	20000.00	20000.00	
	1.00 LS	0	0	0	0	20,000	20,000	20000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	2000.00 EA	0	0	0	6,000	0	6,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00 JOB	404,800	0	0	6,000	20,000	430,800	430800.00

3300.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II; Electrical Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Principal Engineer/Scientist I; Electrical Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Senior Engineer/Scientist II; Instrument Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	100.00 HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist I; Electrical Engineer		67.10	0.00	0.00	0.00	0.00	67.10	
	500.00 HR	33,550	0	0	0	0	33,550	67.10
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00 JOB	88,110	0	0	0	10,000	98,110	98110.00

3300.12.26. PCS PROGRAMMING - GROUNDWATER

3300.12.26.15. PC PROGRAMMING
Process Control programming of PLC/PCS.

USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	50.00 HR	4,565	0	0	0	0	4,565	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	200.00 HR	13,420	0	0	0	0	13,420	67.10

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PC PROGRAMMING	1.00 JOB	18,293	0	0	0	500	18,793	18793.00

3300.12.26.20. MMI PROGRAMMING
Program man-machine interface, control panels, displays.

USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	140.00 HR	9,394	0	0	0	0	9,394	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL MMI PROGRAMMING	1.00 JOB	11,374	0	0	0	500	11,874	11874.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00 JOB	29,667	0	0	0	1,000	30,667	30667.00

3300.12.32. COMPLETION DESIGN - MECHANICAL
Design piping to and from all process equipment, wells, tanks, and instrument requirements, HVAC, building plumbing.

USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	300.00 HR	12,540	0	0	0	0	12,540	41.80
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	200.00 HR	16,940	0	0	0	0	16,940	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	400.00 HR	19,360	0	0	0	0	19,360	48.40

3300.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL COMPLETION DESIGN - MECHANICA	1.00	JOB	59,180	0	0	0	5,000	64,180	64180.00

3300.12.37. COMPLETE DESIGN - SPECIALTY SUB
Specialty sub for steam and electrical resistance heating remediation systems including instrumentation, thermodynamics, estimates of waste removal and rate of heating, cooling, and waste removal rates. Systems may include steam injection, electrical resistance heating and related instrumentation and controls.

USR AA Completion Design from			0.00	0.00	0.00	800000.00	0.00	800000.00	
Conceptual to Bid Package	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL COMPLETE DESIGN - SPECIALTY S	1.00	JOB	0	0	0	800,000	0	800,000	800000.00
TOTAL ENGINEERING	1.00	JOB	752,917	0	0	809,000	46,000	1,607,917	1607917.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15. MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01. CLEAR SITE BRUSH								
L AIR AA Clearing - Medium Brush w/o G		414.45	202.98	0.00	0.00	0.00	617.43	
rub	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
TOTAL CLEAR SITE BRUSH	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
3300.15.02. MOBE EQUIP & FACILITIES								
USR PL Mobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,284	1,284	256.80
TOTAL MOBE EQUIP & FACILITIES	1.00 JOB	0	0	0	0	1,284	1,284	1283.98
3300.15.05. TEMPORARY FACILITIES								
3300.15.05.20. TEMPORARY PAVING								
Paving at site offices and equipment building.								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
M MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	45.00	0.00	0.00	180.94	
se	13.00 TON	1,800	469	751	0	0	3,020	232.32
3954#/CY (2349Kg/M3),Ctrl Plant								
M MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	45.00	0.00	0.00	180.94	
e	13.00 TON	1,800	469	751	0	0	3,020	232.32
3774#/CY (2242Kg/M3),Ctrl Plant								
M CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	1.00	0.00	0.00	3.30	
Coal Tar Emulsion	120.00 SY	251	104	154	0	0	509	4.24
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL TEMPORARY PAVING		6,168	2,242	1,880	0	0	10,291	

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.05.25. WATER LINE								
Water line for site offices and for required process water.								
M MIL PL 4" (10cm) Galv Steel Pipe		23.72	0.24	8.00	0.00	0.00	31.96	
ASTM A-53, T&C, Sch 40	1000.00 LF	30,450	307	10,272	0	0	41,030	41.03
M MIL PL 4" 90 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4" 45 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4"Coupling,Straight 150# MI G		52.37	0.53	60.00	0.00	0.00	112.90	
alv	10.00 EA	672	7	770	0	0	1,450	144.96
M MIL PL 4"Nipple,Galv Stl Sch 40, 4"		17.96	0.18	20.00	0.00	0.00	38.14	
4"(10cm) Long	10.00 EA	231	2	257	0	0	490	48.97
M MIL PL 4" Iron Body Gate Valve, Thrd		84.65	0.71	800.00	0.00	0.00	885.36	
125# Bronze Mtd w/Threaded Va	1.00 EA	109	1	1,027	0	0	1,137	1136.78
M MIL PL 4"IB Swing Ck Vlv,Brz,Flg&125		195.19	1.79	400.00	0.00	0.00	596.98	
#	1.00 EA	251	2	514	0	0	767	766.50
M MIL PL 4" Flanged Backflow Preventer		183.48	1.68	3000.00	0.00	0.00	3185.16	
w/2Gate&2CK Vlv&Auto Dif Rlf	1.00 EA	236	2	3,852	0	0	4,090	4089.66
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de	1000.00 LF	367	1	51	0	0	420	0.42
(15cm)								
USR PL Chlorinate Water Line		126.97	1.07	50.00	0.00	0.00	178.04	
	1.00 JOB	163	1	64	0	0	229	228.60
MIL PL 4" Standard Fire Hydrant		359.13	3.62	927.18	0.00	0.00	1289.93	
One Piece w/5'(1.5M)Burial Se	2.00 EA	922	9	2,381	0	0	3,312	1656.24
cti								

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il	300.00 CY	724	320	0	0	0	1,044	3.48
51 CY/Hr (40M3)/Hr								
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der	390.00 CY	545	229	0	0	0	774	1.99
Without Compaction								
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate	390.00 CY	1,430	33	0	0	0	1,463	3.75
(15cm) Layers								
TOTAL WATER LINE		38,549	942	21,474	0	0	60,965	
3300.15.05.30. PHONE								
USR AA Install Telephone Service		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PHONE		0	0	0	2,000	0	2,000	
3300.15.05.35. SEWER								
8" sewer, manholes and cleanouts for treated water discharge to POTW and for sanitary waste from offices.								
AIR PL 8" (20CM) Pipe Sch 40		8.98	0.09	6.28	0.00	0.00	15.35	
	1000.00 FT	11,528	116	8,063	0	0	19,707	19.71
AIR PL 8" ABS-PVC (1/4 Bend)		39.28	0.40	64.19	0.00	0.00	103.87	
	10.00 EA	504	5	824	0	0	1,334	133.36
AIR PL 8" ABS-PVC (1/8 Bend)		39.28	0.40	51.18	0.00	0.00	90.86	
	10.00 EA	504	5	657	0	0	1,167	116.66
AIR PL 8" ABS-PVC Wye, Standard		52.37	0.53	40.00	0.00	0.00	92.90	
	10.00 EA	672	7	514	0	0	1,193	119.28
AIR PL 8" ABS-PVC Clean Out Tee w/Pl		165.05	1.90	109.00	0.00	0.00	275.96	
ug	10.00 EA	2,119	24	1,400	0	0	3,543	354.32
MIL PL 4'Dia x 6'Deep Precast Manhol		381.35	48.51	233.65	0.00	0.00	663.51	
e	4.00 EA	1,959	249	1,200	0	0	3,408	851.93
8"(20cm)Tk, (1.2M)Dia x (1.8M)Dp								
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL SEWER		21,461	1,003	12,812	25,680	0	60,955	
3300.15.05.40. ELECTRICAL SERVICE								
USR AA Install New 480 3PH Service		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 JOB	0	0	0	20,000	0	20,000	20000.00
TOTAL ELECTRICAL SERVICE		0	0	0	20,000	0	20,000	
3300.15.05.45. GAS SERVICE								
Gas service to provide boiler gas and temporary heating of buildings if needed.								
M MIL PL 8"Dia Sched 40 Stl Gas Dist L		16.69	3.99	15.00	0.00	0.00	35.68	
ine (20cm)Dia Plain End, Tar Coated	1000.00 LF	21,429	5,129	19,260	0	0	45,818	45.82
MIL PL 12",150,000 CF/Hr Gas Turb Me		1142.67	11.53	20054.00	0.00	0.00	21208.20	
ter 175 PSI, Direct Digital, Flanged	1.00 EA	1,467	15	25,749	0	0	27,231	27230.80
B MIL PL 8"(10cm) Gas Pressure Regulat		458.69	4.21	1200.00	0.00	0.00	1662.90	
or Flanged End	1.00 EA	589	5	1,541	0	0	2,135	2135.12

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
B MIL PL 8" Iron Body Gate Valve, Gas		628.47	6.34	1200.00	0.00	0.00	1834.81	
Service	1.00 EA	807	8	1,541	0	0	2,356	2355.85
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL GAS SERVICE		27,362	5,741	48,141	25,680	0	106,925	
TOTAL TEMPORARY FACILITIES	1.00 JOB	93,540	9,928	84,307	73,359	0	261,135	261135.16
3300.15.08. SIGNS, BARRICADES								
3300.15.08. 5. SIGNS								
USR AA Jobsite Signs		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
USR AA Hazard Warning Signs		0.00	0.00	0.00	1000.00	0.00	1000.00	
	1.00 LS	0	0	0	1,000	0	1,000	1000.00
TOTAL SIGNS	20.00 EA	0	0	0	3,000	0	3,000	150.00
3300.15.08.10. BARRICADES/TEMP FENCING								
CIV AA Stl Post, 10'OC f/4' Snow Fen		2.05	0.03	0.99	0.00	0.00	3.07	
ce	400.00 LF	822	10	396	0	0	1,227	3.07
TOTAL BARRICADES/TEMP FENCING	1.00 JOB	822	10	396	0	0	1,227	1227.36

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.08.15. EROSION CONTROL									
Assume silt fence on downstream side of all trenches and building excavations.									
MIL AA Silt Fences, Vinyl, 3' High			2.05	0.01	1.22	0.00	0.00	3.28	
With 7.5' Posts	4000.00	LF	8,211	36	4,880	0	0	13,127	3.28
MIL AA TRENCHR,CHN, 24"DP,6"W,WLK-BE			0.00	2.08	0.00	0.00	0.00	2.08	
HND	32.00	HR	0	67	0	0	0	67	2.08
USR AA Silt Fence Removal			0.96	0.00	0.00	0.00	0.00	0.97	
	4000.00	LF	3,849	17	0	0	0	3,866	0.97
USR AA Silt Fence Disposal (Dumpster			0.00	0.00	0.00	0.00	0.25	0.25	
)	4000.00	LF	0	0	0	0	1,000	1,000	0.25
MIL AA Foreman			38.89	0.00	0.00	0.00	0.00	38.89	
	32.00	HR	1,244	0	0	0	0	1,244	38.89
USR AA Maintain Silt Fences			38.39	0.00	0.00	0.00	0.00	38.39	
	80.00	HR	3,071	0	0	0	0	3,071	38.39
USR AA Dump Truck and Driver			0.00	0.00	0.00	50.00	0.00	50.00	
	16.00	HR	0	0	0	800	0	800	50.00
TOTAL EROSION CONTROL	1.00	JOB	16,376	119	4,880	800	1,000	23,175	23174.96
3300.15.08.20. STREET CLEANING									
MIL AA Skid Loader (Bobcat) w/Sweepe			0.00	17.93	0.00	0.00	0.00	17.93	
r Attachment	120.00	HR	0	2,151	0	0	0	2,151	17.93
TOTAL STREET CLEANING	1.00	JOB	0	2,151	0	0	0	2,151	2151.26
3300.15.08.25. DUST CONTROL									
MIL AA Water Truck			0.00	0.00	0.00	50.00	0.00	50.00	
	1000.00	HR	0	0	0	50,000	0	50,000	50.00
TOTAL DUST CONTROL	1.00	JOB	0	0	0	50,000	0	50,000	50000.00
TOTAL SIGNS, BARRICADES	1.00	JOB	17,197	2,281	5,276	53,800	1,000	79,554	79553.58

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.10. GRAVEL CAP Gravel cap for working surface is 968,109 sq. ft. and 6" thick.								
L MIL AA Gravel Surfacing, Delivered		0.73	1.21	19.79	0.00	0.00	21.74	
	23306 CY	17,121	28,305	461,293	0	0	506,719	21.74
TOTAL GRAVEL CAP	22.20 ACR	17,121	28,305	461,293	0	0	506,719	22825.18
3300.15.15. ASPHALT CAP Asphalt cap is 4" of bituminous concrete surfacing over gravel subbase and covers 38,000 sft in part of CPA.								
MIL PV Crushed Stone Paving, Large A		1.54	0.47	0.34	0.00	0.00	2.35	
rea Prepare and Roll Subbase	4222.00 SY	8,363	2,568	1,820	0	0	12,752	3.02
B MIL PV Bituminous Hot Mix Intrm Cour		35.94	9.37	45.00	0.00	0.00	90.31	
se 3954#/CY (2349Kg/M3),Ctrl Plant	700.00 TON	32,303	8,422	40,445	0	0	81,171	115.96
TOTAL ASPHALT CAP	4222.00 SY	40,667	10,990	42,266	0	0	93,922	22.25
3300.15.92. SURVEYS								
3300.15.92. 5. INITIAL LAYOUT SURVEY								
USR AA Survey Pipelines		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
USR AA General Survey for Controls		0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00 DAY	0	0	0	10,000	0	10,000	1000.00
USR AA Survey Report and Plots		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Facility Layout Survey		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL INITIAL LAYOUT SURVEY	1.00 JOB	0	0	0	24,000	0	24,000	24000.00
3300.15.92.10. SURVEY CONTROLS Controls & QC check during construction								
USR AA Survey Crew, 3 man		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL SURVEY CONTROLS	1.00 JOB	0	0	0	5,000	0	5,000	5000.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SURVEYS	1.00 JOB	0	0	0	29,000	0	29,000	29000.00
3300.15.97. MEETINGS								
3300.15.97.01. Preconstruction Meeting								
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	16.00 HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist III; Lead Engineer		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	10.00 HR	913	0	0	0	0	913	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	400.00 MI	0	0	0	0	140	140	0.35
USR AA M&IE; 3 each for 1/2 day and 1 for full day =2.5 days		0.00	0.00	0.00	0.00	42.00	42.00	
	2.50 DAY	0	0	0	0	105	105	42.00
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 EA	0	0	0	0	500	500	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00
USR AA Lodging		0.00	0.00	0.00	0.00	76.00	76.00	
	1.00 DAY	0	0	0	0	76	76	76.00
TOTAL Preconstruction Meeting	1.00 JOB	5,072	0	0	0	969	6,041	6040.88

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.97.03. Coordination Meeting									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	16.00	HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	160.00	MI	0	0	0	0	56	56	0.35
USR AA M&IE; 3 each for 1/2 day and			0.00	0.00	0.00	0.00	42.00	42.00	
1	2.50	DAY	0	0	0	0	105	105	42.00
for full day =2.5 days									
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	4.00	EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Parking Airports			0.00	0.00	0.00	0.00	10.00	10.00	
	1.00	EA	0	0	0	0	10	10	10.00
USR AA Lodging			0.00	0.00	0.00	0.00	76.00	76.00	
	1.00	DAY	0	0	0	0	76	76	76.00
TOTAL Coordination Meeting	1.00	JOB	3,010	0	0	0	2,385	5,395	5394.60
TOTAL MEETINGS	2.00	EA	8,081	0	0	0	3,354	11,435	5717.74
TOTAL MOBE, SITE WORK, TEMP FACILIT	1.00	JOB	189,040	57,594	593,142	156,159	5,638	1,001,572	1001572.45

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20. TREATMENT SYSTEM CONSTRUCTION								
3300.20.01. TREATMENT PLANT BUILDING Steam Generation and GW treatment plant housed in temporary building (Sprung or Rubb type building) sized 200 ft x 100 ft. Assume air conditioned office to house computers and system controls equipment and operators. Building includes concrete slab. Demolition of these structures assumed after cool down and completion of groundwater pumping.								
USR AA Concrete		0.00	0.00	0.00	250.00	0.00	250.00	
	888.00 CY	0	0	0	222,000	0	222,000	250.00
USR AA Rubb Tent 200 x 100		0.00	0.00	0.00	10.00	0.00	10.00	
	24000 SFT	0	0	0	240,000	0	240,000	10.00
MIL AA Structural Fill		5.09	1.76	19.79	0.00	0.00	26.64	
	240.00 CY	1,221	423	4,750	0	0	6,394	26.64
TOTAL TREATMENT PLANT BUILDING	1.00 JOB	1,221	423	4,750	462,000	0	468,394	468394.25
3300.20.05. TREATMENT SYSTEM EQUIP. F&I								
3300.20.05. 5. EXPEDITOR/QC EQUIP. FABRICATION								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
- Starup/Proveout Project Manager	200.00 HR	14,520	0	0	0	0	14,520	72.60
USR AA Per Diem/M&IE		0.00	0.00	0.00	0.00	150.00	150.00	
	20.00 DAY	0	0	0	0	3,000	3,000	150.00
USR AA Airfare Trips		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	20.00 DAY	0	0	0	0	900	900	45.00
USR AA Taxi/Limo		0.00	0.00	0.00	0.00	20.00	20.00	
	4.00 EA	0	0	0	0	80	80	20.00
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00 JOB	14,520	0	0	0	5,980	20,500	20500.00
3300.20.05.01. EQUIP SUBMITTAL REVIEW								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M ana	100.00 HR	10,340	0	0	0	0	10,340	103.40

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	600.00	HR	35,640	0	0	0	0	35,640	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Blueprints			0.00	0.00	0.00	3.00	0.00	3.00	
	500.00	EA	0	0	0	1,500	0	1,500	3.00
USR AA Mail			0.00	0.00	0.00	12.00	0.00	12.00	
	50.00	EA	0	0	0	600	0	600	12.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00	JOB	47,520	0	0	2,100	0	49,620	49620.00
3300.20.05.10. EQUIPMENT PURCHASE/SHIPPING									
USR AA 21000 Gal Tank; Fresh water,			0.00	0.00	25000.00	0.00	0.00	25000.00	
Coelescing surge, Boiler surg	3.00	LS	0	0	75,000	0	0	75,000	25000.00
e.									
USR AA Oil Skimmer System			0.00	0.00	3500.00	0.00	0.00	3500.00	
	1.00	LS	0	0	3,500	0	0	3,500	3500.00
USR AA Water Softeners, (Waste to			0.00	0.00	120000.00	0.00	0.00	120000.00	
POTW)	1.00	LS	0	0	120,000	0	0	120,000	120000.00
USR AA Water Softener Backwash Sludg			0.00	0.00	5000.00	0.00	0.00	5000.00	
e	1.00	LS	0	0	5,000	0	0	5,000	5000.00
Collector Tank; Waste Salt									
USR AA 10,000 Gal Waste Salt Tank			0.00	0.00	12000.00	0.00	0.00	12000.00	
	1.00	LS	0	0	12,000	0	0	12,000	12000.00
USR AA Steam Boiler			0.00	0.00	275000.00	0.00	0.00	275000.00	
	4.00	LS	0	0	1,100,000	0	0	1,100,000	275000.00
USR AA CEMS System for Boiler Stack			0.00	0.00	75000.00	0.00	0.00	75000.00	
	4.00	EA	0	0	300,000	0	0	300,000	75000.00
USR AA Cogen Elec Generator (Steam			0.00	0.00	75000.00	0.00	0.00	75000.00	
Turbine)	8.00	EA	0	0	600,000	0	0	600,000	75000.00
USR AA Heat Exchanger Condensor			0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00	LS	0	0	40,000	0	0	40,000	40000.00
USR AA Liquid/Vapor Separator			0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00	LS	0	0	8,000	0	0	8,000	8000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Vacuum Pump			0.00	0.00	150000.00	0.00	0.00	150000.00	
piping skid; butterfly valves; flexible piping; camlock connections complete.	1.00	LS	0	0	150,000	0	0	150,000	150000.00
USR AA Liquid Separator			0.00	0.00	16000.00	0.00	0.00	16000.00	
	1.00	LS	0	0	16,000	0	0	16,000	16000.00
USR AA Air Dryer			0.00	0.00	60000.00	0.00	0.00	60000.00	
	1.00	LS	0	0	60,000	0	0	60,000	60000.00
USR AA Freight			0.00	0.00	100000.00	0.00	0.00	100000.00	
	1.00	LS	0	0	100,000	0	0	100,000	100000.00
USR AA Heat Exchanger, Liquids from Extraction Wells			0.00	0.00	60000.00	0.00	0.00	60000.00	
	1.00	EA	0	0	60,000	0	0	60,000	60000.00
USR AA Liquid Cooling Tower			0.00	0.00	45000.00	0.00	0.00	45000.00	
	1.00	LS	0	0	45,000	0	0	45,000	45000.00
USR AA pH Adjust System			0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00	LS	0	0	8,000	0	0	8,000	8000.00
USR AA Solids Holding Bin for Filter			0.00	0.00	5000.00	0.00	0.00	5000.00	
	1.00	LS	0	0	5,000	0	0	5,000	5000.00
USR AA Flocculation System			0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00	LS	0	0	8,000	0	0	8,000	8000.00
USR AA Coelescing Separator			0.00	0.00	220000.00	0.00	0.00	220000.00	
	1.00	LS	0	0	220,000	0	0	220,000	220000.00
USR AA IAF Separator			0.00	0.00	220000.00	0.00	0.00	220000.00	
	1.00	LS	0	0	220,000	0	0	220,000	220000.00
USR AA 40,000 Waste Water Holding Ta nk; Cone Bottom w/Skirts			0.00	0.00	50000.00	0.00	0.00	50000.00	
	1.00	LS	0	0	50,000	0	0	50,000	50000.00
USR AA Steam Regenerated Carbon Syst em (Vapor Ph)			0.00	0.00	250000.00	0.00	0.00	250000.00	
	1.00	LS	0	0	250,000	0	0	250,000	250000.00
USR AA Carbon Polishing Vessels (Vap or Phase)			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Multi Media Vessels			0.00	0.00	30000.00	0.00	0.00	30000.00	
	2.00	LS	0	0	60,000	0	0	60,000	30000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Steam Regenerated GAC System		0.00	0.00	30000.00	0.00	0.00	30000.00	
(Liquid Phase)	2.00 LS	0	0	60,000	0	0	60,000	30000.00
USR AA 1000 SCFM Air Compressor with		0.00	0.00	80000.00	0.00	0.00	80000.00	
Dryer	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA Misc. Pumps, Valves, Fittings		0.00	0.00	200000.00	0.00	0.00	200000.00	
, Conveyance Pipe & Instruments	1.00 LS	0	0	200,000	0	0	200,000	200000.00
USR AA Spare Parts		0.00	0.00	140000.00	0.00	0.00	140000.00	
	1.00 LS	0	0	140,000	0	0	140,000	140000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Initital Chemical Supply		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
TOTAL EQUIPMENT PURCHASE/SHIPPING	1.00 JOB	0	0	4,047,500	0	0	4,047,500	4047500.00
3300.20.05.12. INSTRUMENTATION/CONTROLLERS								
USR AA I/O and Cabinet		0.00	0.00	38000.00	0.00	0.00	38000.00	
	1.00 LS	0	0	38,000	0	0	38,000	38000.00
USR AA Software and Processors		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Autodailer		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I; Instrument Engineer	700.00 HR	63,910	0	0	0	0	63,910	91.30
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	700.00 HR	50,820	0	0	0	0	50,820	72.60
TOTAL INSTRUMENTATION/CONTROLLERS	1.00 JOB	120,538	0	69,000	0	0	189,538	189538.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.13. COMPUTER								
USR AA Computer		0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00 EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software		0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00 EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support Plan		0.00	0.00	0.00	450.00	0.00	450.00	
	1.00 YR	0	0	0	450	0	450	450.00
USR AA Software Training		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II; O&M Project Manager		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	40.00 HR	3,168	0	0	0	0	3,168	79.20
TOTAL COMPUTER	1.00 JOB	6,072	0	5,300	4,450	0	15,822	15822.00
3300.20.05.15. EQUIPMENT INSTALLATION								
USR AA Crane Rental		0.00	0.00	0.00	4000.00	0.00	4000.00	
	4.00 WK	0	0	0	16,000	0	16,000	4000.00
USR AA Materials/Grout/Misc		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 JOB	0	0	20,000	0	0	20,000	20000.00
MIL AA Eq Oper, Medium		56.51	0.00	0.00	0.00	0.00	56.51	
	320.00 HR	18,082	0	0	0	0	18,082	56.51
MIL AA Laborer (Semi-Skilled)		38.39	0.00	0.00	0.00	0.00	38.39	
	960.00 HR	36,854	0	0	0	0	36,854	38.39
UPB AA FORK LIFT,R/T 8,000#,16.00'L -HT		0.00	11.94	0.00	0.00	0.00	11.94	
	240.00 HR	0	2,866	0	0	0	2,866	11.94
TOTAL EQUIPMENT INSTALLATION	1.00 JOB	54,936	2,866	20,000	16,000	0	93,802	93801.69
3300.20.05.16. TREATMENT SYSTEM ELECTRICAL & IN								
USR AA Electrical/Instrumentation Allowance		0.00	0.00	340000.00	0.00	0.00	340000.00	
	1.00 LS	0	0	340,000	0	0	340,000	340000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00 JOB	0	0	340,000	0	0	340,000	340000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.17. MECHANICAL								
USR AA Mechanical Subcontractor Piping GW Treatment/Steam Systems		0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00 JOB	0	0	0	30,000	0	30,000	30000.00
USR AA Plumbing Building		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
USR AA HVAC		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
TOTAL MECHANICAL	1.00 JOB	0	0	0	60,000	0	60,000	60000.00
3300.20.05.20. SPH 6Ph HEATING COMPONENTS								
See backup for costs per Greg Beyke of Thermal Remediation Systems dated 6/14/01 Materials include cable, graphite, steel shot, shipping, hydrating solution, Electrodes, Electrode liquid conduit, and Electrode heads.								
USR AA Electrodes Materials & Shipping		0.00	0.00	3182.61	0.00	0.00	3182.61	
	36.00 EA	0	0	114,574	0	0	114,574	3182.61
USR AA Power Control System for Electrodes Purchase & Mobe		0.00	0.00	0.00	600485.00	0.00	600485.00	
	1.00 EA	0	0	0	600,485	0	600,485	600485.00
USR AA Power Control System Salvage Value		0.00	0.00	-87975.00	0.00	0.00	-87975.00	
	1.00 EA	0	0	-87,975	0	0	-87,975	-87975.00
USR AA Abovegrade Cables & ERH System Materials		0.00	0.00	1187.00	0.00	0.00	1187.00	
	36.00 EA	0	0	42,732	0	0	42,732	1187.00
USR AA Cable Salvage Value		0.00	0.00	-9146.00	0.00	0.00	-9146.00	
	1.00 EA	0	0	-9,146	0	0	-9,146	-9146.00
USR AA TRS On-Site Installation Training/Supervision		0.00	0.00	0.00	106.00	0.00	106.00	
	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA TRS Travel/Per Diems		0.00	0.00	0.00	10900.00	0.00	10900.00	
	1.00 LS	0	0	0	10,900	0	10,900	10900.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	133.00	0.00	133.00	
	54.00 HR	0	0	0	7,182	0	7,182	133.00
USR AA Electrode Connection Labor		0.00	0.00	0.00	101.00	0.00	101.00	
	100.00 HR	0	0	0	10,100	0	10,100	101.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCS Testing		0.00	0.00	0.00	106.00	0.00	106.00	
	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA Supervising Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	6.00 HR	0	0	0	858	0	858	143.00
TOTAL SPH 6Ph HEATING COMPONENTS	1.00 JOB	0	0	60,185	646,485	0	706,670	706669.96
3300.20.05.25. VEA & DPT COMPONENTS								
USR AA Electrode Arrays		0.00	0.00	15.00	0.00	0.00	15.00	
	13160 LFT	0	0	197,400	0	0	197,400	15.00
USR AA Data Collection Equipment		0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Fiber Optic Cable		0.00	0.00	2.50	0.00	0.00	2.50	
	13160 LFT	0	0	32,900	0	0	32,900	2.50
TOTAL VEA & DPT COMPONENTS	1.00 JOB	0	0	300,300	0	0	300,300	300300.00
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00 JOB	243,586	2,866	4,842,285	729,035	5,980	5,823,752	5823751.65
3300.20.07. WELL INSTRUMENTS/CONTROLS								
3300.20.07.10. INSTRUMENT CABLE TO WELLHEADS								
MIL EL 6" Stl Cable Tray-Strt Sect,12' (15cm)w/ hangers & Supports		6.73	0.03	5.91	0.00	0.00	12.67	
	2500.00 LF	21,617	87	18,964	0	0	40,668	16.27
L MIL EL 12"Stl Cable Tray-Strt Sect,12' (31cm)w/ hangers & Supports		2.25	0.01	6.25	0.00	0.00	8.52	
	12000 LF	34,695	139	96,366	0	0	131,200	10.93
MIL EL 12"(31cm)Horz 90,Stl Cable Tray		79.01	0.32	38.68	0.00	0.00	118.01	
	40.00 EA	4,058	16	1,987	0	0	6,061	151.52
MIL EL 12"(31cm)Horz "T",Stl Cable Tray		166.80	0.67	70.24	0.00	0.00	237.71	
	253.00 EA	54,184	217	22,818	0	0	77,218	305.21
MIL EL 12"-6" Reducer,Steel Cable Tray		52.60	0.21	29.44	0.00	0.00	82.25	
	253.00 EA	17,086	69	9,565	0	0	26,719	105.61

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR EL Signal Wire		60.05	0.24	20.00	0.00	0.00	80.29	
	3000.00 KLF	231,297	927	77,038	0	0	309,263	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00 JOB	362,936	1,455	226,738	0	0	591,128	591128.07
3300.20.07.30. WELL INSTRUMENTATION								
USR AA Level Controller		63.49	0.57	600.00	0.00	0.00	664.05	
	168.00 EA	10,666	95	100,800	0	0	111,561	664.05
USR AA Pressure Indicator		63.49	0.57	1000.00	0.00	0.00	1064.05	
	418.00 EA	26,537	236	418,000	0	0	444,773	1064.05
USR AA Temperature Indicator		63.49	0.57	500.00	0.00	0.00	564.05	
	456.00 EA	28,949	258	228,000	0	0	257,207	564.05
USR AA Steam Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	253.00 EA	32,124	286	379,500	0	0	411,910	1628.10
USR AA Water Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	8.00 EA	1,016	9	12,000	0	0	13,025	1628.10
USR AA Vapor Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	167.00 EA	21,204	189	250,500	0	0	271,893	1628.10
USR AA Amperage Meter		126.97	1.13	500.00	0.00	0.00	628.10	
	36.00 EA	4,571	41	18,000	0	0	22,612	628.10
TOTAL WELL INSTRUMENTATION	1.00 JOB	125,067	1,113	1,406,800	0	0	1,532,980	1532980.12
3300.20.07.35. VERTICAL ELECTRODE ARRAYS								
USR AA Drilling, Installing VEA,		0.00	0.00	0.00	40.00	0.00	40.00	
Grouting, Vertical	13160 LFT	0	0	0	526,400	0	526,400	40.00
USR AA Drilling, Installing VEA,		0.00	0.00	0.00	50.00	0.00	50.00	
Grouting, Horizontal in Sloug h	2600.00 LFT	0	0	0	130,000	0	130,000	50.00
USR AA Horizontal Drill Subcontracto		0.00	0.00	0.00	100.00	0.00	100.00	
r Mobe/Demobe	1.00 LS	0	0	0	100	0	100	100.00
TOTAL VERTICAL ELECTRODE ARRAYS	38.00 EA	0	0	0	656,500	0	656,500	17276.32

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.07.40. ELECTRICAL POWER TO WELLS								
AIR EL 2" R.S. Conduit w/Coupling &		6.65	0.03	2.03	0.00	0.00	8.71	
Supp.	3800.00 LF	32,424	147	9,905	0	0	42,476	11.18
AIR EL 3" R.S. Conduit w/Coupling &		7.31	0.03	4.10	0.00	0.00	11.44	
Supp.	3800.00 LF	35,666	162	20,004	0	0	55,833	14.69
AIR EL 1" R.S. Conduit w/Coupling &		4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	3800.00 LF	20,415	93	4,635	0	0	25,143	6.62
CIV EL 1/4" Nylon Pull Cord Installe		0.29	0.00	0.39	0.00	0.00	0.68	
d	38000 LF	14,062	59	18,877	0	0	32,997	0.87
Cable Installation Methods								
MIL EL No 12-Type THWN		159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	14.00 MLF	2,864	13	1,381	0	0	4,258	304.13
MIL EL No 8-Type THWN		264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	14.00 MLF	4,753	22	4,128	0	0	8,902	635.88
MIL EL No 10-Type THWN		200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	14.00 MLF	3,603	16	2,215	0	0	5,835	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00 JOB	113,786	512	61,145	0	0	175,443	175442.65
TOTAL WELL INSTRUMENTS/CONTROLS	1.00 JOB	601,788	3,080	1,694,683	656,500	0	2,956,051	2956050.84

3300.20.10. INSTALL WELLS

3300.20.10. 5. EXTRACTION WELLS THERMAL
Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,

Includes installation of Mobile NAPL wells,

3300.20.10. 5. 5. "A" ZONE WELLS

USR AA Extraction Wells, Thermal		0.00	0.00	0.00	135.00	0.00	135.00	
	120.00 LFT	0	0	0	16,200	0	16,200	135.00
TOTAL "A" ZONE WELLS	1.00 JOB	0	0	0	16,200	0	16,200	16200.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.10. "B" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	10070	LFT	0	0	0	1,359,450	0	1,359,450	135.00
USR AA Additional Cost Wells in Slou gh Drilled w/Barge			0.00	0.00	0.00	5000.00	0.00	5000.00	
	10.00	EA	0	0	0	50,000	0	50,000	5000.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	1,409,450	0	1,409,450	1409450.00
3300.20.10. 5.15. "C" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	3321.00	LFT	0	0	0	448,335	0	448,335	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	448,335	0	448,335	448335.00
3300.20.10. 5.20. "D" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	5385.00	LFT	0	0	0	726,975	0	726,975	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	726,975	0	726,975	726975.00
3300.20.10. 5.25. "E" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	2200.00	LFT	0	0	0	297,000	0	297,000	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	297,000	0	297,000	297000.00
3300.20.10. 5.30. EXTRACTION PUMPS									
USR AA Extraction Pumps Incl Controllers			0.00	0.00	2500.00	0.00	0.00	2500.00	
	159.00	EA	0	0	397,500	0	0	397,500	2500.00
USR AA Extraction Pumps Incl Controllers; Top Loading for LNA			0.00	0.00	2700.00	0.00	0.00	2700.00	
	20.00	EA	0	0	54,000	0	0	54,000	2700.00
USR AA 600 SCFM Compressor to run pu mps			0.00	0.00	40000.00	0.00	0.00	40000.00	
	2.00	EA	0	0	80,000	0	0	80,000	40000.00
USR AA Discharge Tubing Pump to Wellhead; SS			0.00	0.00	11.00	0.00	0.00	11.00	
	19240	LFT	0	0	211,640	0	0	211,640	11.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Air Supply Tubing Wellhead to Pumps	19240 LFT	0.00 0	0.00 0	6.00 115,440	0.00 0	0.00 0	6.00 115,440	6.00
USR AA Pulse Counters w/ 4-20 ma Signal	179.00 EA	0.00 0	0.00 0	395.00 70,705	0.00 0	0.00 0	395.00 70,705	395.00
USR AA Liquid Level Measurment, Portable Magnahelic	1.00 EA	0.00 0	0.00 0	1000.00 1,000	0.00 0	0.00 0	1000.00 1,000	1000.00
USR AA Downwell Liquid Level Bubbler Tube	20000 LFT	0.00 0	0.00 0	2.00 40,000	0.00 0	0.00 0	2.00 40,000	2.00
USR AA Spare Parts; Initial Supply for Pumps	1.00 LS	0.00 0	0.00 0	1000.00 1,000	0.00 0	0.00 0	1000.00 1,000	1000.00
USR AA Connection Fittings; Air & Discharg Tubing/Manifolds, Etc.	179.00 EA	0.00 0	0.00 0	200.00 35,800	0.00 0	0.00 0	200.00 35,800	200.00
USR AA 70 GPM Turbine Pump, High Head	8.00 EA	0.00 0	0.00 0	25000.00 200,000	0.00 0	0.00 0	25000.00 200,000	25000.00
TOTAL EXTRACTION PUMPS	188.00 EA	0	0	1,207,085	0	0	1,207,085	6420.66
3300.20.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps	187.00 EA	0.00 0	0.00 0	0.00 0	725.00 135,575	0.00 0	725.00 135,575	725.00
USR AA Install Down-hole Instruments	336.00 EA	0.00 0	0.00 0	0.00 0	450.00 151,200	0.00 0	450.00 151,200	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	188.00 EA	0	0	0	286,775	0	286,775	1525.40
3300.20.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS Flange on 6" Pipe	167.00 EA	0.00 0	0.00 0	0.00 0	250.00 41,750	0.00 0	250.00 41,750	250.00
TOTAL WELL TOP COMPLETION	166.00 EA	0	0	0	41,750	0	41,750	251.51

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	167.00 EA	0	0	0	167,000	0	167,000	1000.00
TOTAL WELL DEVELOPMENT	166.00 EA	0	0	0	167,000	0	167,000	1006.02
TOTAL EXTRACTION WELLS THERMAL	1.00 JOB	0	0	1,207,085	3,393,485	0	4,600,570	4600570.00
3300.20.10.10. STEAM INJECTION WELLS								
Injection well pricing includes development, handling of cuttings and liquid wastes,								
3300.20.10.10. 5. "A" ZONE WELLS								
USR AA Injection Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	4140.00 LFT	0	0	0	558,900	0	558,900	135.00
TOTAL "A" ZONE WELLS	1.00 JOB	0	0	0	558,900	0	558,900	558900.00
3300.20.10.10.10. "B" ZONE WELLS								
USR AA Injection Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	8075.00 LFT	0	0	0	1,090,125	0	1,090,125	135.00
TOTAL "B" ZONE WELLS	1.00 JOB	0	0	0	1,090,125	0	1,090,125	1090125.00
3300.20.10.10.15. "C" ZONE WELLS								
USR AA Injection Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	4370.00 LFT	0	0	0	589,950	0	589,950	135.00
TOTAL "C" ZONE WELLS	1.00 JOB	0	0	0	589,950	0	589,950	589950.00
3300.20.10.10.20. "D" ZONE WELLS								
USR AA Injection Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	10136 LFT	0	0	0	1,368,360	0	1,368,360	135.00
TOTAL "D" ZONE WELLS	1.00 JOB	0	0	0	1,368,360	0	1,368,360	1368360.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.10.25. "E" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	3378.00	LFT	0	0	0	456,030	0	456,030	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	456,030	0	456,030	456030.00
3300.20.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	249.00	EA	0	0	0	404,625	0	404,625	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	404,625	0	404,625	404625.00
3300.20.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	249.00	EA	0	0	0	62,250	0	62,250	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	62,250	0	62,250	62250.00
3300.20.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	249.00	EA	0	0	0	249,000	0	249,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	249,000	0	249,000	249000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	4,779,240	0	4,779,240	4779240.00
3300.20.10.15. REINJECTION WELLS									
3300.20.10.15.25. "E" ZONE WELLS									
USR AA Reinjection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	840.00	LFT	0	0	0	113,400	0	113,400	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	113,400	0	113,400	113400.00
3300.20.10.15.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	3.00	EA	0	0	0	4,875	0	4,875	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	4,875	0	4,875	4875.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.15.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	3.00 EA	0	0	0	750	0	750	250.00
TOTAL WELL TOP COMPLETION	1.00 JOB	0	0	0	750	0	750	750.00
3300.20.10.15.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	3.00 EA	0	0	0	3,000	0	3,000	1000.00
TOTAL WELL DEVELOPMENT	1.00 JOB	0	0	0	3,000	0	3,000	3000.00
TOTAL REINJECTION WELLS	1.00 JOB	0	0	0	122,025	0	122,025	122025.00
3300.20.10.20. MONITORING WELLS								
3300.20.10.20. 5. INSTALL WELLS								
USR AA Install 4" Monitoring Wells,		0.00	0.00	0.00	100.00	0.00	100.00	
SS	5270.00 LFT	0	0	0	527,000	0	527,000	100.00
Casing and Screens								
TOTAL INSTALL WELLS	37.00 EA	0	0	0	527,000	0	527,000	14243.24
3300.20.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT								
M AIR AA Lo Flo Pump & Teflon Tubing		0.00	0.00	550.00	0.00	0.00	550.00	
	25.00 EA	0	0	13,750	0	0	13,750	550.00
USR AA Portable Air Compressor		0.00	0.00	1835.00	0.00	0.00	1835.00	
	1.00 EA	0	0	1,835	0	0	1,835	1835.00
USR AA Misc Tools & Sampling Equipme		0.00	0.00	1000.00	0.00	0.00	1000.00	
nt	1.00 EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and		0.00	0.00	0.00	100.00	0.00	100.00	
Discharge/Sampling System	25.00 EA	0	0	0	2,500	0	2,500	100.00
USR AA Sample Pump Tubing, Teflon Li		0.00	0.00	3.50	0.00	0.00	3.50	
ned	3600.00 LFT	0	0	12,600	0	0	12,600	3.50
USR AA Slip On Well Cap Assbly		0.00	0.00	65.00	0.00	0.00	65.00	
	25.00 EA	0	0	1,625	0	0	1,625	65.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Flexible Discharge Tubing			0.00	0.00	23.00	0.00	0.00	23.00	
Adaptor	25.00	EA	0	0	575	0	0	575	23.00
USR AA Digital Cycle Controller for			0.00	0.00	2240.00	0.00	0.00	2240.00	
Lo Flow Bladder Pump	1.00	EA	0	0	2,240	0	0	2,240	2240.00
USR AA Multi-parameter Flow Cell &			0.00	0.00	4495.00	0.00	0.00	4495.00	
Meter	1.00	EA	0	0	4,495	0	0	4,495	4495.00
USR AA Liquid Level Measurment/Drawd			0.00	0.00	815.00	0.00	0.00	815.00	
own Meter	1.00	EA	0	0	815	0	0	815	815.00
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	38,935	2,500	0	41,435	41435.00
3300.20.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole			0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	74.00	EA	0	0	0	120,250	0	120,250	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	120,250	0	120,250	120250.00
3300.20.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pi			0.00	0.00	0.00	250.00	0.00	250.00	
pe	37.00	EA	0	0	0	9,250	0	9,250	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	9,250	0	9,250	9250.00
3300.20.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	37.00	EA	0	0	0	37,000	0	37,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	37,000	0	37,000	37000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	38,935	696,000	0	734,935	734935.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.25. TREAT WELL DRILL LIQUIDS/CUTTING								
During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.								
The liquids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.								
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	180.00 EA	0	0	0	72,000	0	72,000	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	40.00 MO	0	40,000	0	0	0	40,000	1000.00
USR AA Treat Contaminated Water		0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	910000 GAL	0	0	0	227,500	0	227,500	0.25
USR AA Onsite Steam Strip Drill		1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	4680.00 TON	8,424	147	0	0	257,400	265,971	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.91 MGL	0	0	0	81,030	0	81,030	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.91 MGL	0	0	0	13,163	0	13,163	14465.00
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.30 KLB	0	0	0	11,613	0	11,613	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.45 KLB	0	0	0	7,861	0	7,861	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	8,424	40,147	0	413,375	257,400	719,346	719346.25
3300.20.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	22.00 EA	0.00 0	0.00 0	0.00 0	161.00 3,542	0.00 0	161.00 3,542	161.00
M AIR AA PCP/Semivolatile Organics (8270)	22.00 EA	0.00 0	0.00 0	0.00 0	180.00 3,960	0.00 0	180.00 3,960	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	9,416	0	9,416	9416.00

3300.20.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	66.00 EA	0.00 0	0.00 0	0.00 0	140.00 9,240	0.00 0	140.00 9,240	140.00
M AIR AA PCP/Semivolatile Organics (8270)	66.00 EA	0.00 0	0.00 0	0.00 0	155.00 10,230	0.00 0	155.00 10,230	155.00
M AIR AA TAL Metals (6010/7000s)	66.00 EA	0.00 0	0.00 0	0.00 0	40.00 2,640	0.00 0	40.00 2,640	40.00
M HTW AA Total Organic Carbons (90600	66.00 EA	0.00 0	0.00 0	0.00 0	55.00 3,630	0.00 0	55.00 3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290)	11.00 EA	0.00 0	0.00 0	0.00 0	950.00 10,450	0.00 0	950.00 10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00 JOB	0	0	0	36,190	0	36,190	36190.00

3300.20.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geologist	1900.00 HR	59.40 112,860	0.00 0	0.00 0	0.00 0	0.00 0	59.40 112,860	59.40
USR AA Engineer/Scientist IV, Sampling Lead	190.00 HR	59.40 11,286	0.00 0	0.00 0	0.00 0	0.00 0	59.40 11,286	59.40

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Technician/Analyst IV, Sampli ng Tech			33.00	0.00	0.00	0.00	0.00	33.00	
	190.00	HR	6,270	0	0	0	0	6,270	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	24.00	HR	1,742	0	0	0	0	1,742	72.60
USR AA Mileage on Personal Car office.			0.00	0.00	0.00	0.00	0.31	0.31	
	1000.00	MI	0	0	0	0	310	310	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging Mgr and HSO.			0.00	0.00	0.00	0.00	198.00	198.00	
	15.00	DAY	0	0	0	0	2,970	2,970	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	15.00	DAY	0	0	0	0	630	630	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	8.00	EA	0	0	0	0	96	96	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	800.00	LFT	0	0	2,000	0	0	2,000	2.50
USR AA Misc Sampling Equipment/Materials			0.00	0.00	400.00	0.00	0.00	400.00	
	1.00	LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00	JOB	136,880	0	2,400	50	4,506	143,836	143835.60
TOTAL INSTALL WELLS	1.00	JOB	145,304	40,147	1,248,420	9,449,781	261,906	11,145,558	11145557.85

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15. PIPING								
3300.20.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	4000.00 LF	30,489	713	24,232	0	0	55,434	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40		9.62	0.52	8.92	0.00	0.00	19.06	
A53	4000.00 LF	49,414	2,660	45,793	0	0	97,867	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40		5.94	0.14	7.18	0.00	0.00	13.26	
A53	1400.00 LF	10,671	250	12,911	0	0	23,832	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std		360.80	19.42	125.85	0.00	0.00	506.07	
Wt	40.00 EA	18,530	998	6,463	0	0	25,991	649.78
MIL PL 6" 90 Degree LR Weld Ell, Std		274.51	6.42	67.81	0.00	0.00	348.74	
Wt	30.00 EA	10,574	247	2,612	0	0	13,433	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	1660.00 LF	16,870	395	6,968	0	0	24,233	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	500.00 EA	106,783	2,497	17,702	0	0	126,983	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	166.00 EA	6,748	158	575	0	0	7,481	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	830.00 EA	63,264	1,480	27,388	0	0	92,132	111.00
AIR AA Slip On Flange 6"		158.30	3.70	40.70	0.00	0.00	202.71	
	50.00 EA	7,915	185	2,035	0	0	10,135	202.71
MIL PL 8" Weld Neck Flange, 150#		156.02	8.40	100.07	0.00	0.00	264.49	
	50.00 EA	10,016	539	6,424	0	0	16,980	339.59
MIL PL 4" x 3" Reducer, Eccentric		166.64	3.90	26.44	0.00	0.00	196.98	
	332.00 EA	71,033	1,661	11,273	0	0	83,967	252.91
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	5.00 EA	535	13	74	0	0	621	124.24

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	996.00	EA	127,860	1,217	9,633	0	0	138,710	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	11.91	0.00	0.00	131.77	
ets	50.00	EA	7,622	73	764	0	0	8,459	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	13.30	0.00	0.00	133.16	
ets	50.00	EA	7,622	73	854	0	0	8,549	170.97
USR PL Pipe Supports			59.36	1.39	200.00	0.00	0.00	260.75	
	720.00	EA	54,880	1,284	184,892	0	0	241,056	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate			256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	4.00	EA	1,317	13	3,123	0	0	4,454	1113.50
125 #									
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate			224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	4.00	EA	1,153	12	1,878	0	0	3,042	760.56
125 #									
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate			114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	332.00	EA	48,883	448	94,911	0	0	144,242	434.46
125 #									
USR PL Fit/Cut/Weld 4" pipe to 6" or			237.46	5.55	0.00	0.00	0.00	243.01	
8"	166.00	EA	50,611	1,184	0	0	0	51,795	312.02
(No Tees required)									
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe			3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	4000.00	LF	20,058	137	12,840	0	0	33,035	8.26
s									
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv			3.91	0.03	1.00	0.00	0.00	4.93	
r	1400.00	LF	7,020	48	1,798	0	0	8,866	6.33
w/Fire Retardant Jackets									
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co			7.81	0.05	1.00	0.00	0.00	8.86	
ver	4000.00	LF	40,117	274	5,136	0	0	45,527	11.38
w/Fire Retardant Jackets									
L MIL PL 0.006" Alum Insul Jacket w/Ba			6.25	0.04	0.16	0.00	0.00	6.45	
nds	12500	SF	100,291	685	2,526	0	0	103,503	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00	JOB	870,277	17,242	482,808	0	0	1,370,327	1370327.47

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.10. LIQUID RECOVERY SYSTEM								
AIR PL Pipe, Iron, Threaded, Sch 80		7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	4000.00 LF	39,263	360	31,843	0	0	71,466	17.87
MIL PL 3" (80mm) Black Pipe, PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	7500.00 LF	76,222	1,782	31,483	0	0	109,487	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std		96.23	2.25	16.68	0.00	0.00	115.16	
Wt	40.00 EA	4,942	116	857	0	0	5,914	147.86
MIL PL 3"Tee, Full Size Butt Weld Std		143.91	3.37	36.78	0.00	0.00	184.06	
Wt	40.00 EA	7,391	173	1,889	0	0	9,453	236.32
MIL PL 1/2"Thread-O-Let, 300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	498.00 EA	20,244	473	1,726	0	0	22,444	45.07
AIR PL Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	996.00 EA	101,222	2,367	25,833	0	0	129,422	129.94
MIL PL 3" (4@5/8Dx3"Lg) Bolt, Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	664.00 EA	40,489	386	3,320	0	0	44,195	66.56
M MIL PL 3" Bronze 125# Gate Valve		70.57	0.65	95.50	0.00	0.00	166.72	
Threaded, Brazed or Soldered	14.00 EA	1,269	12	1,717	0	0	2,997	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl, Sc		23.09	0.19	25.86	0.00	0.00	49.14	
rd	166.00 EA	4,920	41	5,511	0	0	10,473	63.09
Lubricated, Wrench Oper w/Wrench								
M MIL PL 2" Single Disc Type Check Val		37.62	0.33	72.27	0.00	0.00	110.23	
ve	166.00 EA	8,019	71	15,404	0	0	23,494	141.53
IB Wafer Type- 125#								
M MIL PL 2" Bronze 125# Gate Valve		46.17	0.39	31.68	0.00	0.00	78.24	
Threaded, Brazed or Soldered	332.00 EA	19,682	165	13,505	0	0	33,352	100.46
MIL PL Hyd Test, 1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe, 1"Thk Fib Pipe Cover		4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	4000.00 LF	23,089	158	5,107	0	0	28,353	7.09
MIL PL 3"D Pipe, 1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	7500.00 LF	45,761	313	11,886	0	0	57,960	7.73
w/Fire Retardant Jackets								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL 0.006" Alum Insul Jacket w/Ba		7.81	0.05	0.16	0.00	0.00	8.02	
nds	3300.00 SF	33,096	226	667	0	0	33,989	10.30
USR AA Flexible Hose; SS; 5' long; 2		14.84	0.35	150.00	0.00	0.00	165.19	
" dia.	186.00 EA	2,760	65	27,900	0	0	30,725	165.19
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	432,317	6,744	178,645	0	0	617,706	617706.24

3300.20.15.11. EXTRACTION WELLHEAD SPOOL/FTG
Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho		474.91	11.11	350.00	0.00	0.00	836.02	
p Fabricated)	166.00 EA	78,835	1,844	58,100	0	0	138,779	836.02
USR AA Connection Fittings; Air &		118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La bor	186.00 EA	22,083	516	0	0	0	22,600	121.50
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00 JOB	100,918	2,360	58,100	0	0	161,379	161378.71

3300.20.15.15. STEAM INJECTION SYSTEM

3300.20.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40		8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	7500.00 LF	86,457	872	65,112	0	0	152,442	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac		52.37	0.53	50.23	0.00	0.00	103.13	
k	80.00 EA	5,380	54	5,160	0	0	10,594	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	253.00 EA	10,285	241	877	0	0	11,402	45.07
MIL PL 4" Tee, Red Out Butt Weld Std		249.95	5.85	51.39	0.00	0.00	307.19	
Wt	253.00 EA	81,196	1,899	16,695	0	0	99,790	394.43
AIR AA Slip On Flange 4"		105.54	2.47	25.70	0.00	0.00	133.70	
	260.00 EA	27,439	642	6,682	0	0	34,763	133.70

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	260.00	EA	33,377	318	2,515	0	0	36,209	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En			306.39	2.92	244.12	0.00	0.00	553.44	
ds	30.00	EA	11,802	112	9,403	0	0	21,318	710.60
Bellows w/Int Sleeves&Ext Covers									
MIL PL Pipe Support			76.64	1.58	27.24	0.00	0.00	105.46	
	750.00	EA	73,805	1,518	26,228	0	0	101,552	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	30.00	EA	1,304	11	1,684	0	0	3,000	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov			5.10	0.03	1.59	0.00	0.00	6.73	
er	7500.00	LF	49,123	336	15,353	0	0	64,812	8.64
w/Fire Retardant Jackets									
MIL PL 0.006" Alum Insul Jacket w/Ba			8.93	0.06	0.16	0.00	0.00	9.15	
nds	3750.00	SF	42,982	294	758	0	0	44,034	11.74
TOTAL MAIN HEADER PIPING	1.00	JOB	423,151	6,297	150,467	0	0	579,915	579915.10
3300.20.15.15.10. LATERAL PIPING									
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	5060.00	LF	51,424	1,203	21,240	0	0	73,867	14.60
AIR AA Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	2024.00	EA	160,203	3,747	40,885	0	0	204,835	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	2530.00	EA	154,272	1,469	12,651	0	0	168,393	66.56
MIL PL 3" Tee, Red Out Butt Weld Std			143.91	3.37	36.94	0.00	0.00	184.22	
Wt	30.00	EA	5,543	130	1,423	0	0	7,096	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En			263.84	2.51	209.44	0.00	0.00	475.79	
ds	253.00	EA	85,707	816	68,035	0	0	154,558	610.90
Bellows w/Int Sleeves&Ext Covers									
MIL PL 3" OD Snap-On Plastic Valve T			19.53	0.16	6.00	0.00	0.00	25.70	
ag	1012.00	EA	25,382	213	7,793	0	0	33,389	32.99
Includes Insulation									

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL NDT, X-Ray Welds of 3" Dia Pi			50.79	0.45	30.00	0.00	0.00	81.24	
pe	200.00	EA	13,042	116	7,704	0	0	20,862	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	20.00	EA	39,474	351	0	0	0	39,825	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov			4.75	0.03	1.23	0.00	0.00	6.02	
er	5060.00	LF	30,873	211	8,019	0	0	39,104	7.73
w/Fire Retardant Jackets									
M MIL PL 3" Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	506.00	EA	37,119	764	12,994	0	0	50,877	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di			61.16	0.56	56.88	0.00	0.00	118.60	
sc	506.00	EA	39,734	364	36,954	0	0	77,053	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer									
M MIL PL 3" Flg St Press Regul&Reducer			128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	253.00	EA	41,695	975	637,948	0	0	680,619	2690.19
Sgl Seat,Sprg Load Dir Act Diap									
M MIL PL 3" Twin Disc Type Check Valve			45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	253.00	EA	14,623	139	20,741	0	0	35,504	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T			25.39	0.21	18.68	0.00	0.00	44.29	
hrd	253.00	EA	8,249	69	6,069	0	0	14,387	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	4.00	EA	7,895	70	0	0	0	7,965	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	1500.00	EA	60,977	1,426	5,200	0	0	67,603	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	506.00	EA	21,998	185	28,410	0	0	50,593	99.99
TOTAL LATERAL PIPING	1.00	JOB	798,213	12,249	916,067	0	0	1,726,529	1726528.94

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	253.00	EA	60,076	1,405	126,500	0	0	187,981	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	60,076	1,405	126,500	0	0	187,981	187981.20
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	1,281,440	19,952	1,193,034	0	0	2,494,425	2494425.24
3300.20.15.20. H2O REINJECTION SYSTEM									
MIL PL 4" (10cm) Galv Steel Pipe			8.98	0.09	9.10	0.00	0.00	18.16	
ASTM A-53, T&C, Sch 40	1500.00	LF	17,291	174	17,517	0	0	34,983	23.32
MIL PL 2-1/2" (60mm) Galv Steel Pipe			5.73	0.05	4.64	0.00	0.00	10.43	
ASTM A-53, T&C, Sch 40	500.00	LF	3,681	34	2,980	0	0	6,695	13.39
MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	60.52	0.00	0.00	113.42	
v	10.00	EA	672	7	777	0	0	1,456	145.62
MIL PL 2-1/2"90 Degree Ell,150# MI G			36.70	0.34	20.80	0.00	0.00	57.84	
alv	10.00	EA	471	4	267	0	0	743	74.26
MIL PL 4" 45 Degree Ell, 150# MI Gal			52.37	0.53	69.20	0.00	0.00	122.10	
v	10.00	EA	672	7	889	0	0	1,568	156.78
MIL PL 2-1/2"45 Degree Ell,150# MI G			36.70	0.34	28.39	0.00	0.00	65.43	
alv	10.00	EA	471	4	365	0	0	840	84.00
MIL PL 4" Tee, Red Out 150# MI Galv			66.15	0.67	98.70	0.00	0.00	165.52	
	2.00	EA	170	2	253	0	0	425	212.52
MIL PL 4" Cap, 150# MI Galvanized			17.96	0.18	32.49	0.00	0.00	50.63	
	1.00	EA	23	0	42	0	0	65	65.00
MIL PL 2-1/2" Union, 150# MI Galvani			39.89	0.37	39.11	0.00	0.00	79.36	
zed	4.00	EA	205	2	201	0	0	408	101.90
MIL PL 2-1/2"Nipple,Galv Stl Sch 40,			12.23	0.11	8.79	0.00	0.00	21.13	
4"	10.00	EA	157	1	113	0	0	271	27.13
4"(10cm) Long									
MIL PL 4"Nipple,Galv Stl Sch 40, 4"			17.96	0.18	12.92	0.00	0.00	31.05	
4"(10cm) Long	10.00	EA	231	2	166	0	0	399	39.87

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4" Screwed Flange,Galv (125#			71.83	0.72	17.49	0.00	0.00	90.04	
CI)	4.00	EA	369	4	90	0	0	462	115.62
MIL PL 2-1/2"Scrd Flange,Galv (125#			42.28	0.39	10.00	0.00	0.00	52.66	
CI)	4.00	EA	217	2	51	0	0	270	67.61
MIL PL 4"Coupling,Straight 150# MI G			52.37	0.53	50.70	0.00	0.00	103.60	
alv	10.00	EA	672	7	651	0	0	1,330	133.02
MIL PL 2-1/2"Coupling,Strt 150# MI G			36.70	0.34	19.04	0.00	0.00	56.07	
alv	10.00	EA	471	4	244	0	0	720	72.00
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	6.00	EA	244	6	21	0	0	270	45.07
AIR AA 4" Weldolet			158.30	3.70	7.20	0.00	0.00	169.21	
	20.00	EA	3,166	74	144	0	0	3,384	169.21
M MIL PL Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	150.00	EA	11,004	226	3,852	0	0	15,082	100.55
AIR AA 2 1/2" Weldolet			105.54	2.47	4.90	0.00	0.00	112.90	
	20.00	EA	2,111	49	98	0	0	2,258	112.90
TOTAL H2O REINJECTION SYSTEM	1.00	JOB	42,299	610	28,720	0	0	71,630	71629.65
3300.20.15.25. STEAM GENERATION SYSTEM									
USR AA Mechanical Subcontractor F&I			0.00	0.00	0.00	30000.00	0.00	30000.00	
Steam Generation System Pipin	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
g									
TOTAL STEAM GENERATION SYSTEM	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
3300.20.15.30. WATER TREATMENT SYSTEM									
USR AA Mechanical Piping & Hookup			0.00	0.00	0.00	240000.00	0.00	240000.00	
Treatment System	1.00	JOB	0	0	0	240,000	0	240,000	240000.00
TOTAL WATER TREATMENT SYSTEM	1.00	JOB	0	0	0	240,000	0	240,000	240000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.35. AIR PIPING								
MIL PL 2"(50mm) A-53 Pipe, Sch 40		4.83	0.04	2.13	0.00	0.00	7.00	
Not Incl Hangers or Fittings	6700.00 LF	41,536	381	18,324	0	0	60,241	8.99
MIL PL 1"(25mm) A-53 Pipe, Sch 40		3.21	0.03	1.02	0.00	0.00	4.25	
Not Incl Hangers or Fittings	4000.00 LF	16,474	151	5,216	0	0	21,840	5.46
MIL PL 2" 90 Degree ELL,150# MI Blac		24.79	0.23	6.25	0.00	0.00	31.27	
k	80.00 EA	2,547	23	642	0	0	3,212	40.15
MIL PL 1" 90 Degree Ell, 150# MI Bla		15.29	0.14	1.96	0.00	0.00	17.39	
ck	400.00 EA	7,853	72	1,007	0	0	8,931	22.33
MIL PL 1" Coupling, Strt 150# MI Bla		15.29	0.14	2.29	0.00	0.00	17.72	
ck	150.00 EA	2,945	27	441	0	0	3,413	22.75
MIL PL 2" Coupling, Strt 150# MI Bla		24.79	0.23	5.68	0.00	0.00	30.70	
ck	75.00 EA	2,388	22	547	0	0	2,957	39.42
MIL PL 1" Union, 150# MI Black		20.85	0.19	5.68	0.00	0.00	26.72	
	900.00 EA	24,093	221	6,565	0	0	30,879	34.31
MIL PL 2" Union, 150# MI Black		36.70	0.34	12.09	0.00	0.00	49.12	
	75.00 EA	3,534	32	1,165	0	0	4,731	63.07
MIL PL 1" Nipple, Black Stl Sch 40,		7.06	0.06	0.59	0.00	0.00	7.72	
4"	400.00 EA	3,624	33	305	0	0	3,963	9.91
MIL PL 2" Nipple, Black Stl Sch 40,		9.86	0.09	1.19	0.00	0.00	11.14	
4"	75.00 EA	950	9	114	0	0	1,073	14.31
MIL PL 2" Tee, Red Out 150# MI Galv		36.70	0.34	13.41	0.00	0.00	50.45	
	400.00 EA	18,846	173	6,890	0	0	25,909	64.77
MIL PL 1" Tee, Straight 150# MI Galv		20.85	0.19	3.66	0.00	0.00	24.70	
	400.00 EA	10,708	98	1,881	0	0	12,687	31.72
MIL PL 1"D Plug Valve, Semi-Stl,Scrd		28.22	0.24	29.42	0.00	0.00	57.88	
Lubricated,Wrench Oper w/Wren	400.00 EA	14,491	122	15,111	0	0	29,724	74.31
ch								
MIL PL 2"D Plug Valve, Semi-Stl,Scrd		50.79	0.43	31.31	0.00	0.00	82.53	
Lubricated,Wrench Oper w/Wren	40.00 EA	2,608	22	1,608	0	0	4,239	105.97
ch								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 1"Thrd St Press Regul & Red,I			59.06	0.53	356.42	0.00	0.00	416.00	
B	400.00	EA	30,331	270	183,054	0	0	213,655	534.14
Sgl Seat,Sprg Load Dir Act Diap									
MIL PL 1" ID Hose x 1-1/4" MPT			13.74	0.07	0.82	0.00	0.00	14.63	
Serrated Shank Nipple	400.00	EA	7,055	38	422	0	0	7,515	18.79
TOTAL AIR PIPING	1.00	JOB	189,983	1,694	243,291	0	0	434,968	434968.35
TOTAL PIPING	1.00	JOB	2,917,235	48,603	2,184,598	270,000	0	5,420,436	5420435.65
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	3,909,134	95,118	9,974,736	11567316	267,886	25,814,190	25814190.24

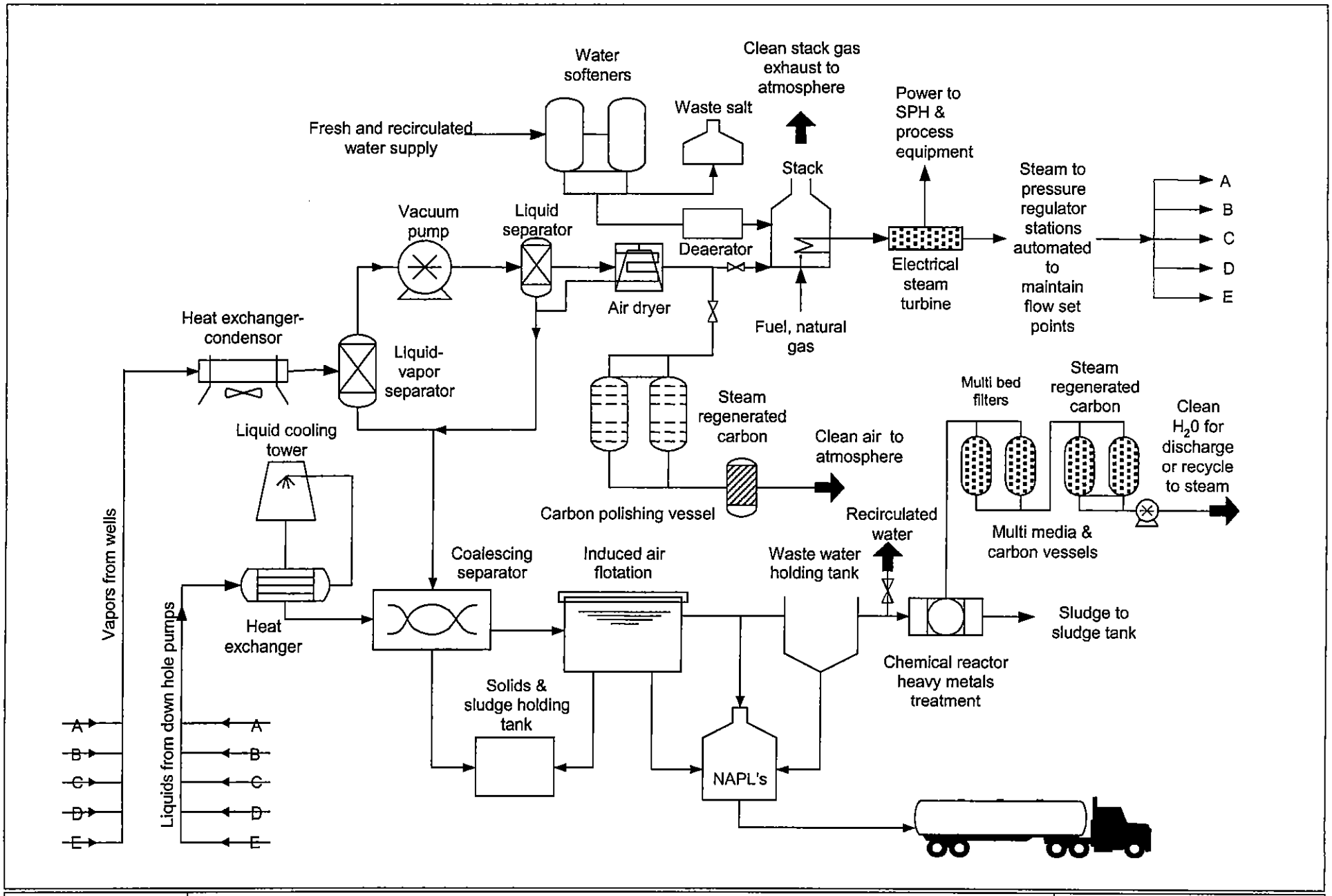


Figure 4-1
Surface Process Diagram

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN
McCormick and Baxter Superfund Site
Stockton, California

Table 3-10
Total Liquid Extraction Rates and Design Capacity of Effluent Treatment System

	Scenario 1	Scenario 2	Scenario 3
Equivalent steam injection rate	186 gpm	274 gpm	386 gpm
Design extraction rate	280 gpm	410 gpm	580 gpm
Miscellaneous process water	40 gpm	55 gpm	70 gpm
Over-extraction need from pump & treat estimate	235 gpm	235 gpm	235 gpm
Total effluent treatment system capacity	475 gpm	575 gpm	700 gpm

Table 4-2
Effluent Treatment System—Components and Sizes

Component	Parameter	Unit	Scenario 1	Scenario 2	Scenario 3	Comment/assumption
Vapor phase liquid separator 1	Air flow rate	scfm air	4,733	7,100	9,467	Non-condensable gas plus 10% of injected steam as condensable vapor
	Liquid flow rate	gpm condensate	22	27	32	Assuming max 5% of liquid extracted with vapor stream
Liquid phase heat exchanger	Liquid flow rate	gpm water	435	535	635	Injected plus 235 gpm
	Cooling capacity	MM BTU/hr	22	27	32	Assumed 100 F cooling
Vapor phase heat exchanger/condensor	Cooling capacity	MM BTU/hr	12	17	22	Assumed 10% of injected energy as steam and energy in 200F condensate
Vapor phase liquid separator 2	Air flow rate	scfm air	1,000	1,500	2,000	
	Liquid flow rate	gpm condensate	23	34	45	Based on maximum vapor phase cooling capacity
Vacuum pumps	Air flow rate	scfm	1,000	1,500	2,000	
	Vacuum	psig	-10	-10	-10	Need to apply vacuum
Vapor treatment units	Air flow rate	scfm	1,000	1,500	2,000	
Water surge tank	Retention time	hours	1	1	1	Need settling and separation time for solids and NAPL
	Minimum capacity	gallons	26,100	32,100	38,100	
Dissolved Air Floatation	Water flow rate	gpm	435	535	635	Recovered fluid and condensate not to exceed maximum pumping rate
	NAPL flow rate	gpm	11	13	16	Assumed max NAPL ratio of 2.5% of total water flow
Multimedia filters	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
Water treatment unit (GAC)	Water flow rate	gpm	475	575	700	DAF flow rates plus process water
NAPL holding tanks	Capacity	gallons	21,000	21,000	21,000	Tanks added and emptied for disposal as needed
	Minimum number	#	2	2	2	Empty backup tank on-site

Table 4-1
Maximum Injection Pressures for Different Depth Zones

	A	B	C	D	E
Depth to top of injection screen (ft)	25	60	125	155	240
Injection pressure (psig)	12.5	30	63	78	107

Table 3-1
Summary of Well Counts by Layer and Scenario

Scenario 1	SES Injection Wells	SES Extraction Wells	SES Dual Purpose Wells	Collocated Injection and Electrical Heating Wells	Collocated Extraction and Electrical Heating Wells	New Perimeter Monitoring Wells	New NAPL Extraction Wells	Deep VBA Hole	Shallow VBA Hole
Completion Zone									
A	53	2	0	0	0	8	5	0	0
B	54	69	0	0	0	10	4	0	13
C	13	14	0	0	0	10	0	0	0
D	3	11	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	25	0
Scenario 2	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VBA Hole**	**Shallow VBA Hole**
Zone of Completion									
A	57	2	0	0	0	8	5	0	0
B	73	74	0	0	9	10	1	0	13
C	22	20	0	0	0	7	0	0	0
D	3	14	0	32	13	5	0	0	0
E	10	4	1	0	0	6	0	27	0
Scenario 3	**SES Injection Wells**	**SES Extraction Wells**	**SES Dual Purpose Wells**	**Collocated Injection and Electrical Heating Wells**	**Collocated Extraction and Electrical Heating Wells**	**New Perimeter Monitoring Wells**	**New NAPL Extraction Wells**	**Deep VBA Hole**	**Shallow VBA Hole**
Zone of Completion									
A	69	2	0	0	0	8	0	0	0
B	85	97	0	0	9	10	0	0	13
C	28	22	0	0	0	8	0	0	0
D	23	16	0	32	13	5	0	0	0
E	12	6	2	0	0	6	0	27	0

"Steve Carroll" <carroll@steamtech.com>

07/02/01 09:22 AM

To: Harry_Ehlers@URSCorp.com
cc:
Subject: RE: angled drilling at McCormick and Baxter site

Good Morning Harry,

further to our telephone conversation of Friday afternoon, I have made some enquiries and found that San Francisco - Sacramento area environmental drilling contractors typically had doubts about drilling to depths of 300 feet at the angles of interest. On the face of it, this might require some changes to the design, possibly with additional, deeper, drilling from a barge in the slough.

I am assured by Patrick Langan (775-246-0296) of Boart Longyear in Dayton, NV, that they would anticipate no difficulty in drilling to these depths at angles as low as 45 degrees using rotary or sonic rigs with down-hole casing advance and that 4 or 6-inch casing and screen could be installed. You may wish to talk to him.

Let me know if I can be of any assistance.

Steve Carroll

(661) 322 6552 Fax
(908) 653-1313 Fax

June 12, 2001

John E. Spear
URS Corporation
12 Commerce Drive
Cranford, NJ 07016-1101

Tim Cechini
Lane Christiansen
Fontana, CA

Re: McCormick and Baxter Superfund Site
Stockton, CA
Drilling Pricing

Dear Tim:

As we discussed in early May we need budget pricing for the drilling and installation of wells at the referenced site. We are working on an Engineers estimate for the Feasibility of this option under contract with the USACOE.

The pricing could be broken down in the following unit prices:

		Unit Price
1. Drilling wells, 12" dia. (288 Wells)	36,851 LFT	135 00/ft
These are extraction and injection wells with 6" casing/screens all Stainless Steel. Note that 15 of these wells will be drilled off barge in the Old Mormon Slough. Also 15 of these wells will be drilled at an angle from the bank under the Slough.		
2. Install URS furnished Electrodes	44 EA	450 00/each
These electrodes will go in the bottom of some of the 288 wells drilled above.		
3. Install URS furnished Extraction Pumps	124 EA	725 00/each
4. Install URS furnished Thermocouples ave 40 00/lft →	38 EA	9000 00/each
These thermocouples (VEA's) will be installed in 4" dia holes and grouted solid. Total drilling for these 38 will be 8,560 vertical feet.		
5. 12" Protective Case and Well head up to flange	288 EA	250/well
6. Install URS furnished Down Hole Instruments	288 EA	450 00/each
7. Well Development	288 EA	1000 00/each
288 Extraction and Injection wells. Monitoring wells below.		
8. Pump tests	4 EA	6,300 00/well

Extraction Well
pumps 725 00
Level 450
Temp 450
1625

9. Monitoring wells (39 each with 4" SS Piping/Screens) 5,580 LFT 100/ft
Complete including drilling, developing, piping, locking caps,

All wells above would include packing, grout etc required in ea. Well.

If you have any questions please call me in my NJ office at 908-653-3154 or 908-653-1300. My fax number in NJ is 908-653-1313.

Cordially,

John E. Spear

[redacted]

BPeake@qedenv.com

06/21/2001 10:49 AM
AST

To:john_spear@urscorp.com
cc:MParker@qedenv.com, telecorder@aol.com
bcc:
Subject:Budget Pricing

Jack

You are working on a very interesting project. Hopefully your proposal proves to be

QED provided a large dedicated groundwater sampling system at the McCormick Baxter s

Please let us know how things progress and if you need any additional information.

Thank you

Brad Peake
Regional Sales Manager
Severn Trent/ QED Environmental Systems
800-624-2026
bpeake@qedenv.com

(See attached file: McCormickBaxterSteam.xls)

McCormickBaxterSteam.xls	**Type:** application/msexcel **Name:** McCormickBaxterSteam.xls

Item	Description	Quantity	Unit Price	Extended Price	
1	HammerHead Pump, bottom load, high temp, Stainless	163	2500	$ 407,500.00	
2	HammerHead Pump, top load, high temp, Stainless	20	2700	$ 54,000.00	
3	Air Compressor, Rotary Screw, NEMA 4, 600 scfm, 125 HP	1	40000	$ 40,000.00	
4	Flexible discharge tubing, pump to piping manifold	14000	11	$ 154,000.00	
5	Air supply tubing, pump to wellhead, stainless steel	14000	6	$ 84,000.00	
6	Pulse Counter with output 4-20 ma signal	163	395	$ 64,385.00	
7	Liquid level measurement, portable magnahelic	1	1000	$ 1,000.00	
7a	Downwell liquid level bubbler tube	14000	2	$ 28,000.00	
8	Spare parts for 163 HammerHead pumps (7 years)	7	6000	$ 42,000.00	
				$ 874,885.00	
	Prices are budgetary and not intended to be final. Pricing				
	does not include freight or any applicable sales or use tax.				

HammerHead™

H4 Series (wells 4" & up)

INSTALLATION & OPERATION MANUAL

Models H45SSB, H45SEB, HF45SSB, HF45SEB, H45SET, HF45SET, and HF43SET

HAMMERHEAD
CLEANUP PUMPS

QED GroundWater Specialists®
P.O. Box 3726 Ann Arbor, MI 48106 USA

Part No. 95067
REV.#2 1-2-95

HAMMERHEAD™ CLEANUP PUMPS

HammerHead™ H4 Series pumps (patent pending) are high-rate, air-driven pneumatic pumps primarily useful for total fluids applications. They run automatically, with the Hammer Drive magnetic relay and internal float system. The system senses liquid level in the pump, turning the air supply on when the pump is full, and turning it off as soon as the pump empties.

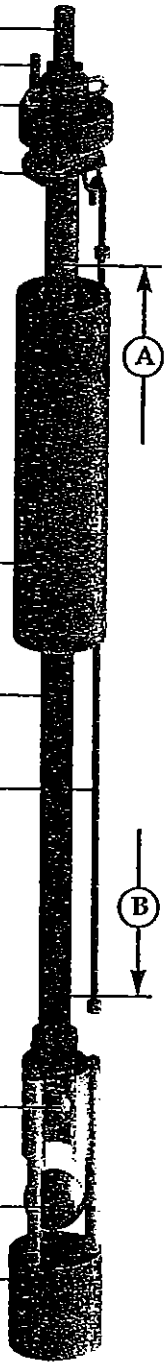
With built-in control, a HammerHead pump doesn't require air cycle timers or on-off level controls at the wellhead, simplifying system design. System setup is easy—just run air to each well. Continued operation is truly hands-off. The pump constantly reacts to changes in well yield, so it always pumps at the highest rate possible, and shuts down automatically when the well drops below pumping level. (NOTE: H4 Series pumps require a minimum of 3.5 feet of liquid above the bottom of the inlet in order to run.)

Because cycling is controlled downwell, a HammerHead pump is either refilling or discharging 100% of the time. There's no waiting between active phases of the cycle for the entire length of air supply tubing to re-pressurize. This operating efficiency enables H4 Series pumps to deliver maximum flow rates of more than 11 gallons per minute while also saving on air supply requirements. It also keeps air out of the liquid discharge system, preventing over-pumping, foaming, and emulsification.

The HammerHead pumping mechanism uses the same high-clearance design and stay-clean ball check valves that set the PULSE PUMP® standard for field performance without clogging or breakdowns. All parts, including the Hammer Drive system, are easily field serviceable.

HOW THE HAMMERHEAD PUMP WORKS

- An H4 Series pump requires a minimum depth of 42" of liquid (measured from the bottom of the pump) to begin pumping.
- The pump automatically shuts off when the liquid level is pumped down below this level, and will automatically begin pumping again once well level has recovered.



A. Top of float with pump full
Float in this position slides the actuator rod upward, triggering Hammer Drive mechanism and causing air to enter the pump. The air pressure seats the inlet check ball, keeping liquid from entering or leaving through the inlet. Liquid in the pump body is forced into the discharge tube and up to the surface. The discharge check ball is unseated by the upward force of the liquid.

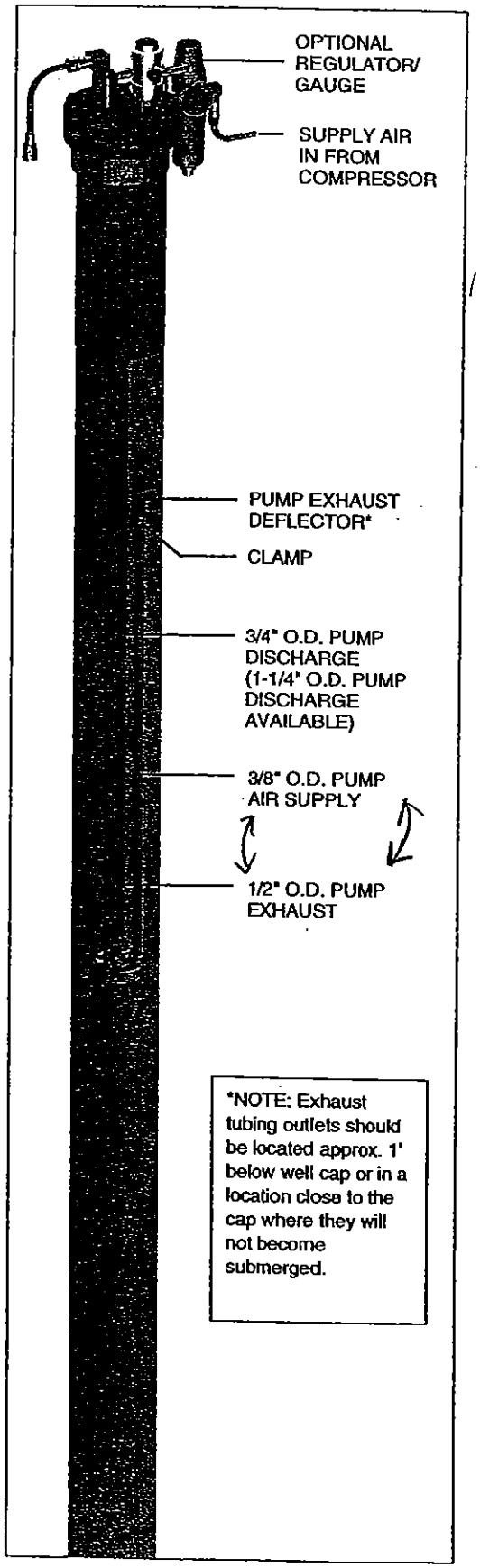
B. Bottom of float with pump empty
Float in this position slides actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (no longer having any pressure holding it down), which allows the next fill of liquid from the well into the pump. As the pump refills, the float rises back to the top position and the cycle is repeated. The discharge check ball is seated by the weight of liquid in the discharge tube above it, preventing that liquid from falling back into the pump body.

H4 SERIES SPECIFICATIONS

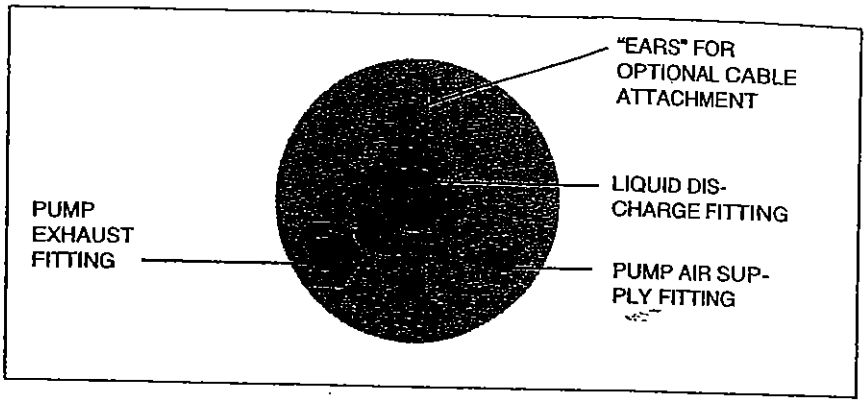
	H4 Series Bottom Inlet	H4 Series Top Inlet	Short H4, Top Inlet
Model No.	H45SSB, H45SEB, HF45SSB, HF45SEB	H45SET, HF45SET	HF43SET
Pump Type	Positive Air Displacement	Positive Air Displacement	Positive Air Displacement
Inlet	Bottom	Top	Top
O.D.	3.5" (89 mm)	3.5" (89 mm)	3.5" (89 mm)
Length	55" (140 cm)	60" (152 cm)	42" (105 cm)
Weight	23.5 lbs. (10.7 kg)	24.0 lbs. (10.9 kg)	16.0 lbs. (7.3 kg)
Materials	Stainless steel construction, with Teflon® inlet and discharge check balls, stainless steel or epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings,
Fittings: Type*	Barb	Barb	Barb
Sizes: Liquid Discharge	3/4" (19 mm) O.D. (H45SSB, H45SEB) or 1-1/4" (32 mm) O.D. (HF45SSB, HF45SEB)	3/4" (19 mm) O.D. (H45SET) or 1-1/4" (32 mm) O.D. (HF45SET)	1 1/4" (32 mm) O.D. Tube
Air Supply	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing
Exhaust	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing
Pump Stroke	0.8 gal. (2850 ml.)	0.8 gal. (2850 ml.)	0.32 gal. (1200 ml.)
Operating pressure range	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)	10-100 psi (70- 695 kPa)
Maximum lift	300 ft. (90 m)	300 ft. (90 m)	200 ft. (60 m)
Maximum flow rate	14+ GPM (54+ LPM) HF45SSB, HF45SEB	11+ GPM (41+ LPM) HF45SET	10 GPM (38 LPM)
Minimum submergence	42" (107 cm) above pump bottom	Top Inlet Port— 58" (147 cm) above bottom of pump	Top Inlet Port— 38" (97 cm) above bottom of pump
Density of pumped liquid	1.0 g/cc (stainless float); 0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)
Cap sizes**	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)

* Note: Pumps are available with tubing or hose; quick disconnect fittings are available on request.

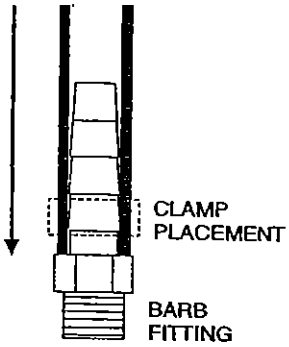
** Special caps available.



*NOTE: Exhaust tubing outlets should be located approx. 1' below well cap or in a location close to the cap where they will not become submerged.



STEP 1. Attach Tubing to Pump



A. Cut back sheathing on tubing set approximately 1 foot.

B. **Slip clamps over appropriate tubes prior to connecting to barbs.**

C. Push tubing down flush with the fitting's nut if possible; cover at least 3 barbs if 3 or more are present. (Note: in freezing weather, this is easier if tubing is dipped in warm water for a few seconds to soften the nylon.)

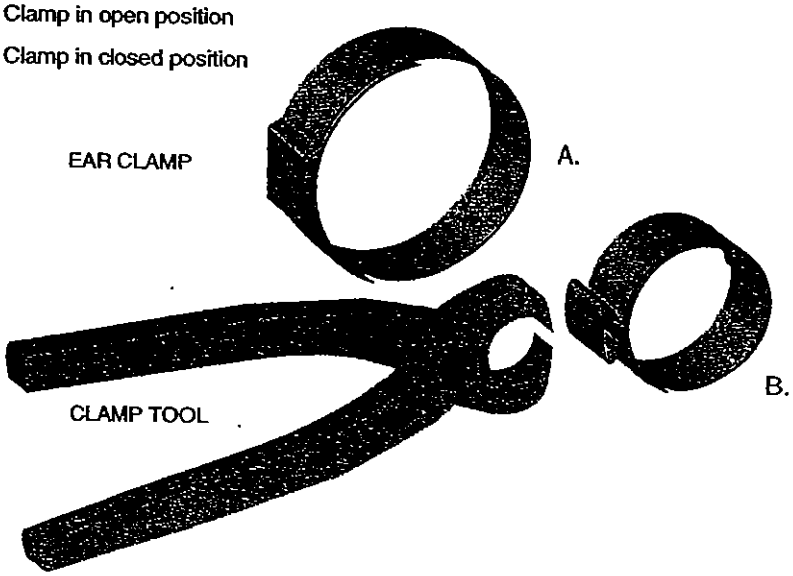
D. Place clamp over lowest barb completely covered by tubing.

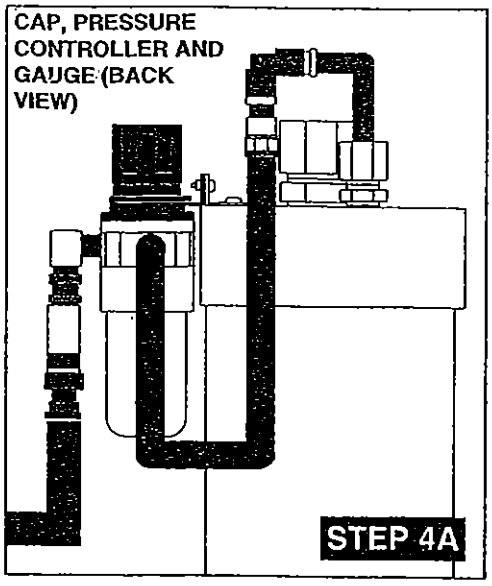
STEP 2. Tighten Clamps

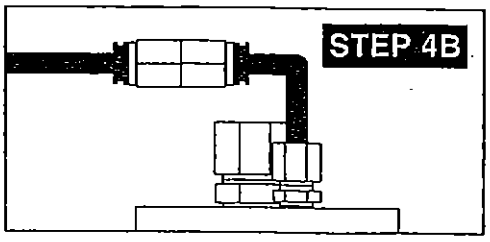
A. Place clamp tool over the dimpled ear portion of the clamp and squeeze ear together (as shown).

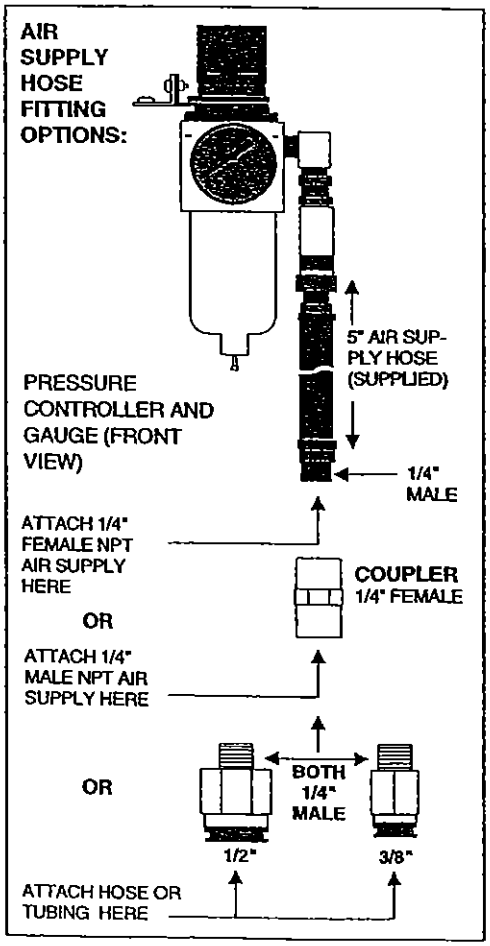
A. Clamp in open position

B. Clamp in closed position









STEP 3. Install Pump in Well

A. Lower pump to desired depth.

B. Once pump depth has been determined, measure off approximately 1 ft. of tubing length (measured from the top of well casing) from the pump exhaust line.

C. Cut exhaust line.

D. Attach the pump exhaust deflector to the pump exhaust line. (See clamp instructions in step 2.)

E. Pass pump discharge and air supply lines through the well cap: place well cap on casing.

F. Re-adjust pump to desired depth.

G. Cut air supply and discharge tubes to desired length.

H. Tighten fittings down onto air/discharge lines, and tighten well cap clamp if present.

STEP 4. Connect Air Supply and Discharge

A. If optional pressure regulator is used, connect short (≈1 foot) hose from regulator to pump air supply line with attached push-on elbow; attach 5' flexible hose to quick-connect fitting on regulator and to air supply line from compressor. See illustration at lower left for air supply hose fitting options.

OR

B. If optional pressure regulator is not used, connect air supply line from compressor directly to pump air supply line above well cap (fittings and coupler for 3/8" and/or 1/2" connections).

C. Connect pump discharge tube to discharge header. (Barb and clamps supplied with pump.)

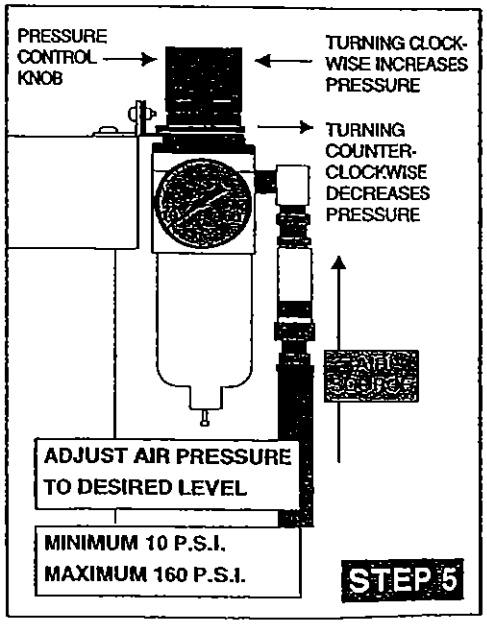
STEP 5. Set Air Pressure

NOTE: Flow Rate is dependent on the amount of air pressure that is received by the pump. Flow rates can be increased by increasing air pressure to the pump or decreased by decreasing air pressure to the pump. For satisfactory performance, pressure should be set at or above 1 psi for every 2 feet of total discharge head—i.e., a pump with T.D.H. of 200' would require 100 psi or more to pump effectively.

A. Adjust air pressure to desired level at compressor—minimum 10 psi, maximum 160 psi.

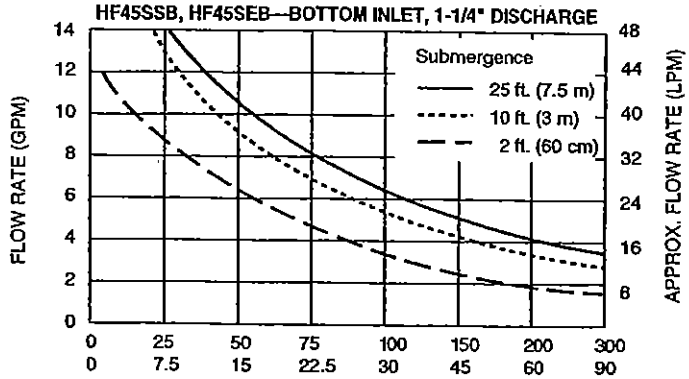
OR

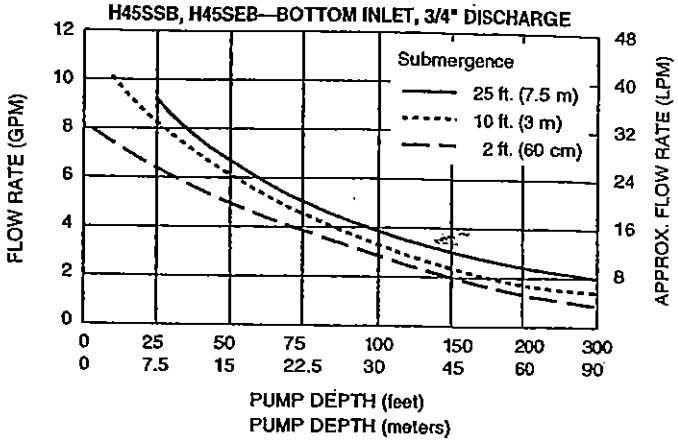
B. Adjust air pressure with optional pressure regulator (see illustration).

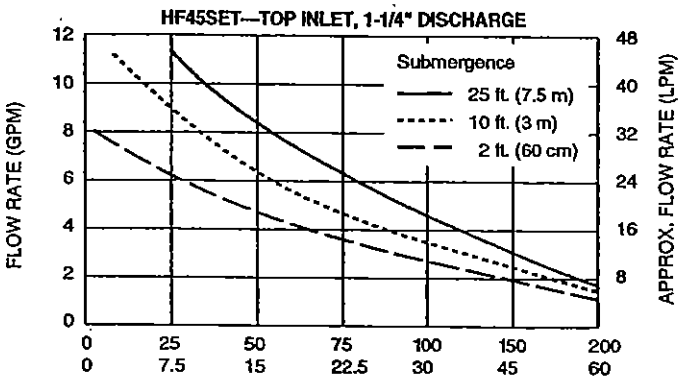


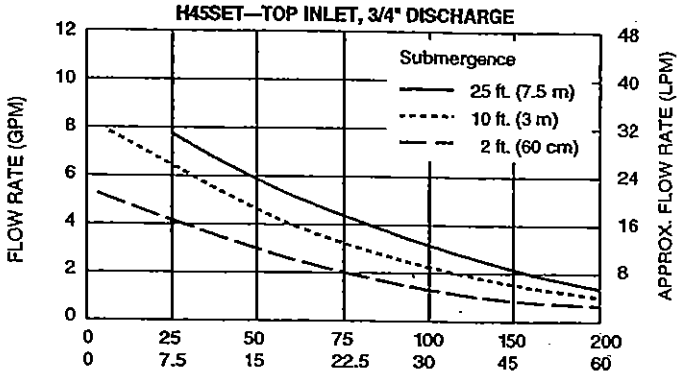
H4 SERIES FLOW PERFORMANCE CURVES

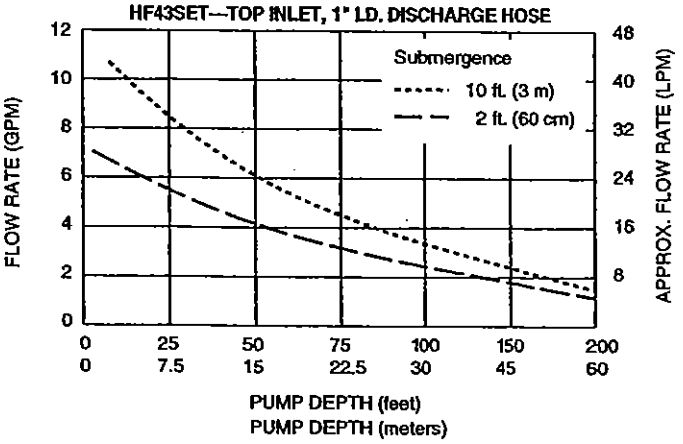
*100 psi (700 kPa) drive air pressure was supplied for all pump depths less than 150 feet (45 meters); 160 psi was supplied for all pump depths greater than 150 feet.











NOTE: Pump depth is measured down from the top of the well casing to the top of the pump fittings. Submergence is measured up from the lowest inlet point on the pump inlet to the top of the static water or product in the well.

ID	A	Max Pump rate
1 1/4"	= 1.6	12
3/4"	= 0.5	8.
1/2"	= 0.25	~4?

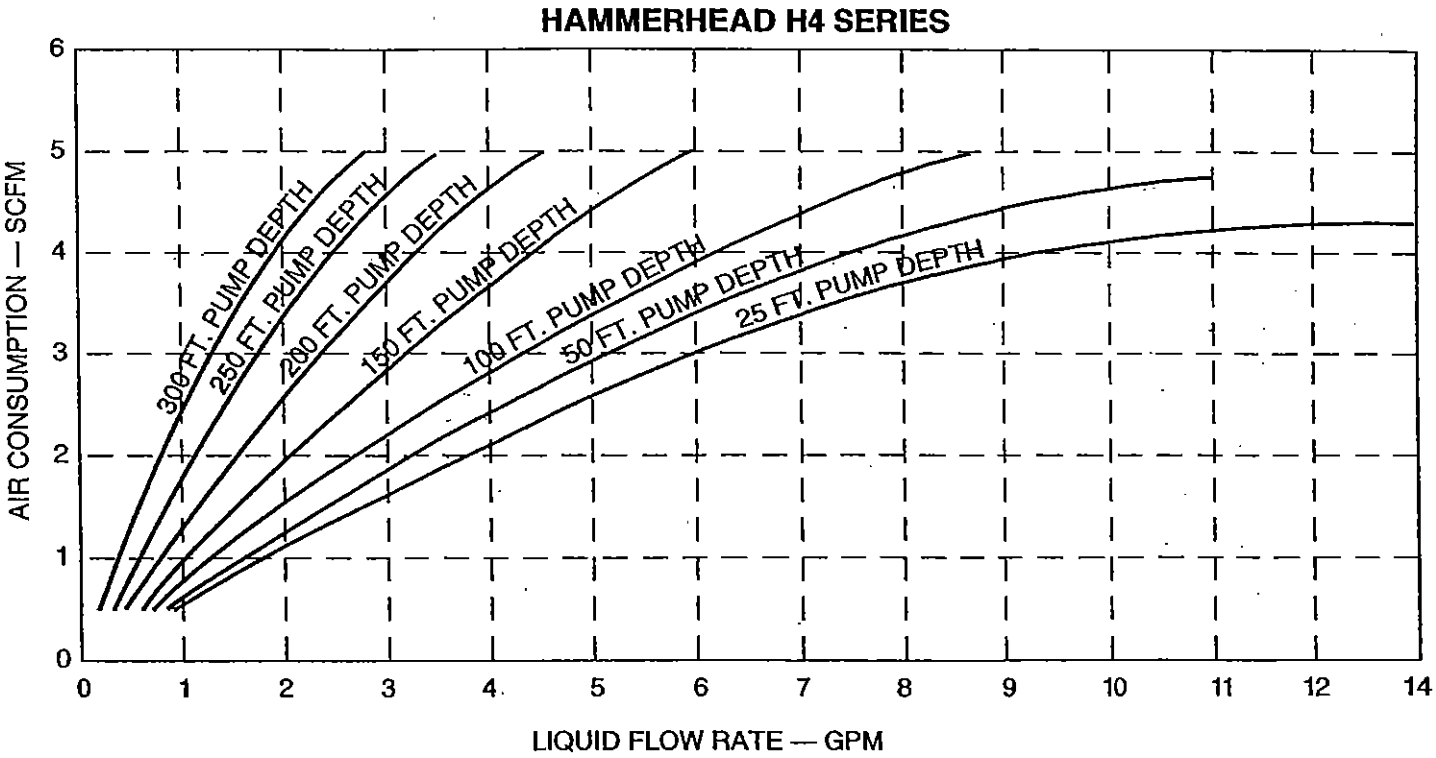
ACCESSORIES

MODEL	PUMP MODEL	DESCRIPTION
37000	All Models	Pump Cycle Counter (for Flow Totalization)
L374	All Models	Tank Full Shutoff
37050	All Models	Kit - Regulator/Gauge
KIH4ST	All Bot. Inlet mod.	Kit - Top Inlet Conversion - H4
KIH4SB	All Top Inlet mod.	Kit - Bottom Inlet Conversion - H4
CH52	All Bot. Inlet mod.	Can - 2' (60 cm) Length (Leachate)
95067	All Models	HammerHead O&M Manual
SPTOOLS	All Models	Clamp Tool, Tube Cutter

MODEL	PUMP MODEL	DESCRIPTION
37058	All Models	Kit - Cable Attachment
37060	All Models	Cable - 3/16" (5 mm) S.S. - order by ft.
37207	All Models	Rope - 3/8" (9 mm) Polypro. - order by ft.
37212	All Models	Cable Sling Assembly
37216	HF4 Series	* Hose - 1" (25 mm) I.D. Discharge (Black)
37217	HF4 Series	* Hose - 3/8" (9 mm) I.D. Air Supply (Red)
37218	HF4 Series	* Hose - 3/8" (9 mm) I.D. Exhaust (Gray)
37208	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Pump
37209	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Well Top
36824	All Models	Flow Throttle Valve

* Hose to be sold with quick connects only

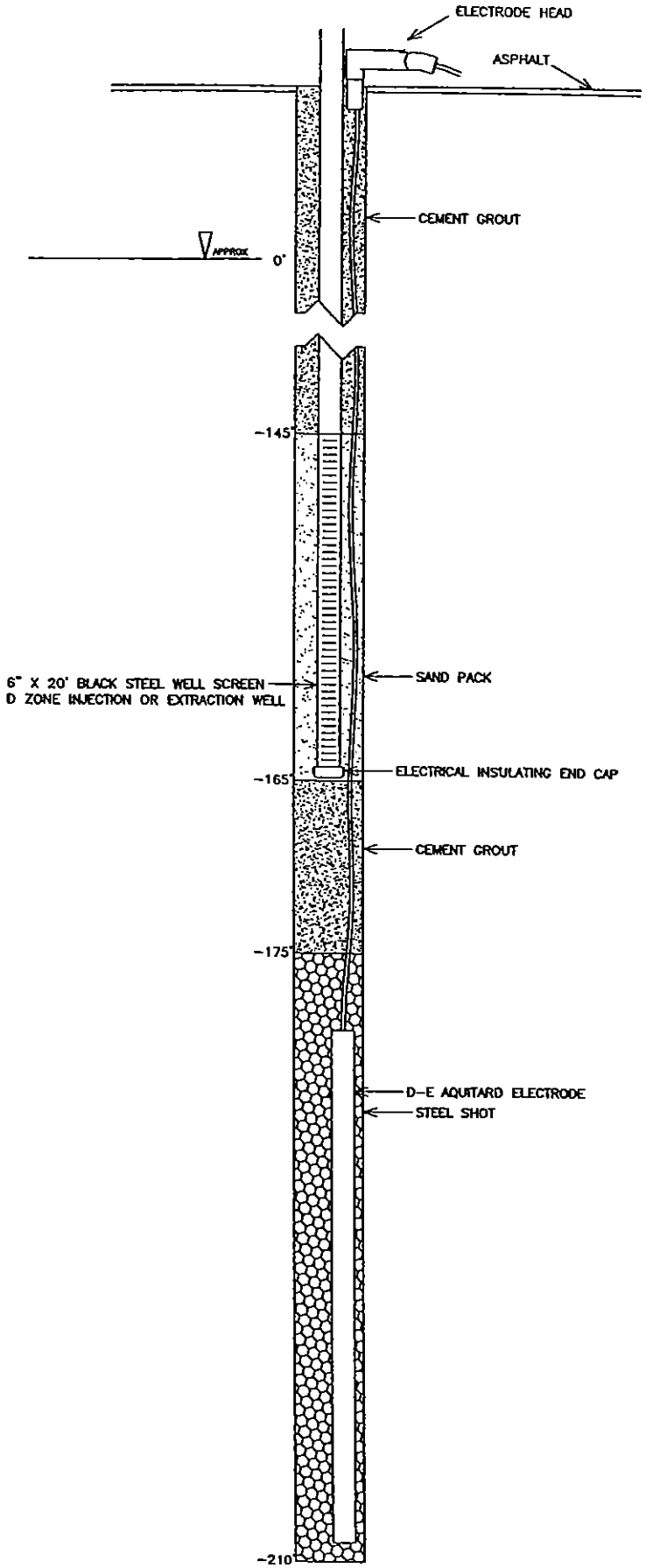
AIR CONSUMPTION



IMPORTANT — AIR FLOW IS ACTUAL. A MAXIMUM "ON-TIME" DUTY CYCLE FOR THE COMPRESSOR MUST BE CONSIDERED IN SELECTING A COMPRESSOR CAPACITY.

MINIMUM AIR FLOW REQUIRED 0.5 SCFM @ 10 PSI
MAXIMUM AIR PRESSURE 160 PSI

HANDOUT #4


ELECTRODE HEAD
ASPHALT
CEMENT GROUT
APPROX
0'
-145'
6" X 20' BLACK STEEL WELL SCREEN
D ZONE INJECTION OR EXTRACTION WELL
SAND PACK
-165'
ELECTRICAL INSULATING END CAP
CEMENT GROUT
-175'
D-E AQUITARD ELECTRODE
STEEL SHOT
-210'

6/20/01

To: Brad Peake QED

From: Jack Spear URS c/o Steamtech (Bakersfield)

12 Commerce Dr.
Cranford, NJ 07016
email: john_spear@urscorp.com

Please quote "budget" pricing for pumps & misc. on next page.

Call if you need.

Bakersfield till 6/21/01 661-322-6478
Cranford after 24th : 908-653-3154

Jack

Brad Peake 800-624-2026

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
1	H4 Hammerhead Pump (bottom loading)	163 EA		
2	H4 Hammerhead Pump (top loading)	20 EA		
4	Air Compressor 600 scfm w/dryer	1 EA		
5	Flexible Tubing (Connection well head to Piping Manifold)	183 EA		
6	Air Tubing (pump to well head) Stainless Steel	14000 LFT		
7	Pulse Counter w/output 4-20 ma signal	163 EA		
8	Pressure transducer w/bubbler probe (ss probe & 1/4" tube) (include line to vacuum to record dif. Press.)	163 EA		
9	Spare parts for 7 years operation	1 ls		

Note: Temperatures in well to 200 deg. F

Bryan Root in Ann Arbor 6/20/01

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
	1 H4 Hammerhead Pump (bottom loading)	163 EA		
	2 H4 Hammerhead Pump (top loading)	20 EA		
	3 Control Panel for up to 205 pumps not needed	1 EA		
	4 Air Compressor 600 cfm needed	1 EA		
	5 Flexible Tubing (Connection well head to ~~Header~~ Manifold at surface)	183 EA		
SS	6 Air Tubing (pump to well head) ~~standard good for 180°F~~	LFT		
	7 Pulse Counter w/output 4-20 ma signal	1 EA		

travel up to 1/4 mile to PLC

8. Level Controller — would use if want to maintain pull pump to level. do have surface pressure transducer with bubbler probe. down well SS probe 1/4" SS tube to bubbler probe line to vac line to compressor to bubbler reads dif back pressure

9. No electrical wiring at all

Local Rep will call
David Counter QED - San Diego - 760-247-6305 hm.&c.

Send to Ann Arbor Fx# 734-995-1170

Attn Brad ~~Peck~~ Peake (Reg Sales Manager)

Dave Corder # telecorder@aol.com
send email

Table 3-8
Summary of Steam, Power, and Water Demand

	Scenario 1	Scenario 2	Scenario 3
Steam demand during 360 day heat-up	93,000 lbs/hr (100 MM BTU/hr gas)	137,000 lbs/hr (150 MM BTU/hr gas)	193,000 lbs/hr (200 MM BTU/hr gas)
Steam demand during years 2-4	75,000 lbs/hr	101,000 lbs/hr	147,000 lbs/hr
Power demand for electrical heating during year 1 and 2	5,100 kW max 2,550 kW avg	7,400 kW max 3,680 kW avg	7,400 kW max 3,680 kW avg
Maximum water supply for steam generation	205 gpm	310 gpm	440 gpm

Table 3-9
Electrical Heating Design Parameters and Power Demand

	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	13
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	35 tons
Estimated Distance Between Electrodes:	60 ft	60 ft
Total Depth of Electrodes:	220 ft bgs	108 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	52 ft MLLW
Electrode Steel Shot Required:	119 tons	54 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control Units:	5,100 kW	2,300 kW
Average Electrical Heating Power Input:	2,550 kW	1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr

Harry Ehlers
06/14/01 09:10 AM

To: John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: Costs for ERH

Jack, I received this from Greg Beyke today.

Harry Ehlers, Project Engineer
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
Harry_Ehlers@urscorp.com
206/438-2700 (office)
206/438-2699 (fax)

—— Forwarded by Harry Ehlers/Seattle/URSCorp on 06/14/01 09:12 AM ——

Greg Beyke
<gbeyke@bellsouth.net>
06/14/01 09:12 AM

To: Harry Ehlers <harry_ehlers@urscorp.com>
cc:
Subject: Costs for ERH

Harry,

Please forward this to Jack. He called me on the road Tuesday. This is the first chance I have had to get back to my office and to the Stockton figures. Please pay particular attention to the items in red font - they are either unnecessary (due to being included in some other portion of the cost estimate), or you might have better cost numbers than I.

Call me with the inevitable questions.

Greg

ERH Cost and Summary 6-14.

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only.					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		8,970	$8.00	$71,760	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		237,100	$0.16	$37,936	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$16,671	
Hydrating Solution (lbs/electrode, electro	140	46	$0.40	$2,576	
Metal Electrodes (shipping, electrodes, co	$660	46	$125	$6,428	
Electrode Liquid Conduit		8,970	$1.10	$9,867	
Electrode Heads		46	$25	$1,150	
Subtotal Electrode Materials					$146,400
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	46	40	$75	$138,000	
Forklift to offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		80	$106	$8,480	
TRS Travel, Per Diem, and Car	$2,400	10	$106	$3,460	
Drill Cutting Waste Disposal (tons,$/ton)		50	$250	$12,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		14	$133	$1,862	
Subtotal Other Electrode Installation Costs					$165,200
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		60	$106	$6,360	
PCS Preliminary Design and Specifications		60	$143	$8,580	
PCS Cost (kW,$/kW)		5,100	$115	$586,500	
PCS Shipping (mi,$/mi)		2800	$3.50	$9,800	
Miscellaneous Shipping	$1,000			$1,000	
Crane to Offload PCS	$2,000			$2,000	
Mobilization Labor		24	$101	$2,424	
PCS Pad and Building (sq.ft., $/sq.ft.)		700	$13.25	$9,275	
TRS Senior Project Manager		6	$133	$798	
Subtotal Power Control System (PCS) Purchase and Mobilization					$626,700
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$3,450	16560	$2.25	$40,710	
Cable Shipping		1500	$1.75	$2,625	
Electrode Wetting System Materials	$4,480			$4,480	
Grounding System Materials ($, feet, $/ft)	$2,760	3,680	$1.10	$6,808	
Subtotal ERH System Construction Materials and Shipping					$54,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		115	$101	$11,615	
PCS Testing		80	$106	$8,480	
Electrode Wetting System Labor		46	$80	$3,680	
Telephone Installation				$500	
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$16,000			$16,000	
TRS Travel, Per Diem, and Car	$3,200	40	$106	$7,440	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		6	$143	$858	

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$93,900
Start-up Labor					
Electrical Specialist		172	$101	$17,372	
Staff Professional		172	$106	$18,232	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		20	$143	$2,860	
Professional Travel and Per Diem	$4,400	50	$106	$9,700	
Subtotal Start-up Labor					$54,300
ERH System Operations and Reporting (per week)					
Electrical Specialist		40	$101	$4,040	
Staff Professional		15	$106	$1,590	
Repair/Consumable Materials	$300			$300	
TRS Senior Project Manager		7	$133	$931	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$300	3.0	$101	$603	
ERH Operations (per week)				$7,890	
Total ERH Operations Cost (weeks, $/week)		100	$7,890		$786,600
Electrical Usage		#########	$0.053		$2,347,700
Demobilization and Salvage					
Planning		80	$133	$10,640	
Forklift/Crane	$2,000			$2,000	
Trash Disposal	$500	3	$80	$740	
Electrical Specialist		160	$101	$16,160	
Staff Professional		40	$106	$4,240	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$900	10	$101	$1,910	
PCS Salvage Value		$586,500	-15%	-$87,975	
Cable Salvage Value		$37,260	-30%	-$11,178	
Subtotal Demobilization and Salvage					-$61,700
Final Reporting					
Electrical Specialist		40	$101	$4,040	
Staff Professional		120	$106	$12,720	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		40	$143	$5,720	
Travel, Per Diem, and Car	$2,400	20	$101	$4,420	
Subtotal Final Reporting					$29,600

Total ERH Cost ########

Project Name:	N-MPA B/BC	Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only. Well pumps and casing are not included - assumed to be part of Scenario 1 (base case)					
1) Electrode Installation					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		2,070	$8.00	$16,560	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		66,300	$0.16	$10,608	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$5,226	
Hydrating Solution (lbs/electrode, electro	200	9	$0.40	$720	
Metal Electrodes (shipping, electrodes, co	$380	18	$181	$3,632	
Electrode Liquid Conduit		1,350	$1.10	$1,485	
Electrode Heads		9	$25	$225	
Subtotal Electrode Materials					$38,500
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	9	25	$75	$16,875	
Barge for Drilling	included in Scenario 1				
Drilling Overcasing	included in Scenario 1				
Cable and Hose Floats	included in Scenario 1				
Forklift to Offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		40	$106	$4,240	
TRS Travel, Per Diem, and Car	$1,600	10	$106	$2,660	
Drill Cutting Waste Disposal (tons,$/ton)		6	$250	$1,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		8	$133	$1,064	
Subtotal Other Electrode Installation Costs					$27,300
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		20	$106	$2,120	
PCS Preliminary Design and Specifications		20	$143	$2,860	
PCS Cost (kW,$/kW)		2,300	$115	$264,500	
PCS Shipping (mi,$/mi)		2800	$1.75	$4,900	
Miscellaneous Shipping	$500			$500	
Crane to Offload PCS	$500			$500	
Mobilization Labor		4	$101	$404	
PCS Pad and Building (add. sq.ft., $/sq.ft.)		200	$13.25	$2,650	
TRS Senior Project Manager		3	$133	$399	
Subtotal Power Control System (PCS) Purchase and Mobilization					$278,800
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$675	3996	$2.25	$9,666	
Cable Shipping		1500	$0.25	$375	
Electrode Wetting System Materials	$1,520			$1,520	
Grounding System Materials ($, feet, $/ft)	$0	0	$1.10	$0	
Subtotal ERH System Construction Materials and Shipping					$11,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		23	$101	$2,323	
PCS Testing		20	$106	$2,120	
Electrode Wetting System Labor		9	$80	$720	
Telephone Installation				$500	

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$4,000			$4,000	
TRS Travel, Per Diem, and Car	$1,600	20	$106	$3,720	
TRS Senior Project Manager		12	$133	$1,596	
Supervising Professional		2	$143	$286	
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$55,300
Start-up Labor					
Electrical Specialist		86	$101	$8,686	
Staff Professional		86	$106	$9,116	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		10	$143	$1,430	
Professional Travel and Per Diem	$1,800	20	$106	$3,920	
Subtotal Start-up Labor					$26,100
ERH System Operations and Reporting (per week)					
Electrical Specialist		0	$101	$0	
Staff Professional		8	$106	$848	
Repair/Consumable Materials	$150			$150	
TRS Senior Project Manager		4	$133	$532	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$200	2.0	$101	$402	
ERH Operations (per week)				$2,220	
Total ERH Operations Cost (weeks, $/week)		100	$2,220		$221,300
Electrical Usage		#########	$0.053		$1,037,700
Demobilization and Salvage					
Planning		20	$133	$2,660	
Forklift/Crane	$0			$0	
Trash Disposal	$100	1	$80	$180	
Electrical Specialist		40	$101	$4,040	
Staff Professional		20	$106	$2,120	
TRS Senior Project Manager		5	$133	$665	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$800	10	$101	$1,810	
PCS Salvage Value		$264,500	-15%	-$39,675	
Cable Salvage Value		$8,991	-30%	-$2,697	
Subtotal Demobilization and Salvage					-$30,600
Final Reporting					
Electrical Specialist		20	$101	$2,020	
Staff Professional		60	$106	$6,360	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		20	$143	$2,860	
Travel, Per Diem, and Car	$1,200	10	$101	$2,210	
Subtotal Final Reporting					$14,800
Total ERH Cost					########

Table 1 - Remediation Parameters and Cost

Site Name:	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	9
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	6 tons
Estimated Distance Between Electrodes:	60 ft	74 ft
Total Depth of Electrodes:	220 ft bgs	105 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	55 ft MLLW
Electrode Steel Shot Required:	119 tons	33 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control System (PCS):	5,100 kW	2,300 kW
Average Electrical Heating Power Input:		1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr
Electrode Materials and Shipping	$146,400	$38,500
Other Electrode Installation Costs	$165,200	$27,300
PCS Purchase and Mobilization	$626,700	$278,800
ERH System Materials and Shipping	$54,600	$11,600
Labor and Other ERH System Construction Costs	$93,900	$55,300
Start-up Labor	$54,300	$26,100
ERH Operations Cost	$786,600	$221,300
Electrical Usage (at $0.053 per kW-hr)	$2,347,700	$1,037,700
Demobilization and Salvage	-$61,700	-$30,600
Final Reporting	$29,600	$14,800
	$4,243,300	**$1,680,800**

"Steam Tech"
<heron@steamtech.com>

07/07/01 06:59 PM

To: John_Spear@URSCorp.com, carroll@steamtech.com
cc: "Susan Schima" <schima@steamtech.com>, sowers@steamtech.com, Harry_Ehlers@URSCorp.com
Subject: Re: VEA & DPT questions

>
>
> "Susan
> Schima"
> <schima@steam
> tech.com>

To: John_Spear@URSCorp.com
cc: heron@steamtech.com,
sowers@steamtech.com
Subject: Re: Questions &
comments on text

> 07/06/2001
> 04:14 PM

>
>
>
>
>
>
>
> Dear Jack,
>
> Below are some costing estimates involved with an ERT survey. These are
> ballpark figures, based on current market values for materials and
> equipment rentals. Please do not hesitate to email me for any further
> questions or for more details on the costing breakdown.
>
> You might expect the general costs for fabricating and operating an ERT and
> temperature survey to include the following:
>
> VEA Fabrication with Thermocouples: $150 per 10 ft, assuming one
> electrode
> and two thermocouples per 10 ft, includes labor and materials
>
> Data Collection Hardware: $300 per day
>
> Mob/Demob: $3000
>
> Labor:
> Data Collection: $300 per day
> Processing Data: $160 per day
> Imaging Data: $145 per day
>
> Note the VEA cost estimate is PER 10 FT. This includes the material costs,
> such as Teflon wire, fiberglass rod, stainless steel electrode, etc, and
> labor for one supervisor and one technician. So, for a single VEA at 120 ft
> depth, the cost might be around $1800.
>
> Also, the VEA cost was based on CPT push. You may need to add more for
> drilling.
>
> Please see Table 6.1.1 for proposed schedule of data collection days to
> estimate grand total for that.
>
>
>
> Distributed Temperature Sensing (DTS) might break down as follows:
>
> Fiber Optic Cable: expect $2.50 per ft for the high temperature, durable,
> coated cable
>
> Data Collection Equipment: $70,000.00 to buy, $6,000 per month lease
>

>
>
>
> Sincerely,
> Susan
>
>
>
>
>

MB-replies-Jack-July7.do

Hello Jack,

I will try to answer your questions, since I will be on the road until Thursday morning.

Jacvk: I must be really stupid but I still don't understand this whole system and Table 6.1.1 also confuses me somewhat. Do we have the fiber optic DPT system? It isn't mentioned in Section 6.1 of the text but is in Appendix D. I had thought that the idea was played with but wasn't part of this CD.

Gorm: Don't worry, we know you are a bright fella. Yes we plan to include DTS in the design. Susan, please review the text and make sure that we present this design.

Jack: Regarding the VEA in operation. Will the operators at the site (we currently have two full time 24 hours/day plus a technical person 8 hours per day during thermal and cool down phases in the estimate) be able to provide the labor that Susan mentions to operate and monitor the VEA system or do we need the additional at the rates quoted below for data collection, processing data and imaging data?

Gorm: Please assume that the operators can run the DTS as well.

Jack: What additional system/hardware/software besides our computer system priced for the site operators office do we need to collect and report the data from the VEA array? Susan mentions a pretty expensive data collection system for the DPT which if we need I will add to the estimate but I'm not sure what else. Gorm gave me a table with the linear ft of VEA needed and I have priced installation including grouting of this in the estimate but I have not received anything about the DPT system and how it is installed. If we don't use the fiber optic wire is there some other temperature sensing system that will be installed?

Will a data collection and some kind of power wire be needed for every electrode going back to the operations office? What is the number of electrodes? (Perhaps the number is on a table somewhere and I have forgotten where.).

Gorm: We need a DTS system (70k). The fiberoptic cable and ERT electrodes with wires should be included in the cost per 10 ft provided by Susan.

Jack: As for Table 6.1.1 what are the "new P&T" extraction wells and monitoring wells? Is this a left over from the time we were planning to P&T for 20 or more years after the cool down or are these the extraction and monitoring wells we still have in the system?

Gorm: They are the NAPL recovery and hydraulic control wells located outside the thermal treatment area, as designed by Mike Bailey.

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25. START UP, TESTING, O&M PLAN								
3300.25. 5. O&M MANUAL								
3300.25. 5.10. PCS Commissioning Manual								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00 EA	4,268	0	0	0	500	4,768	4768.00
3300.25. 5.13. Preliminary Draft - O&M Manual Spec Section 01830								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Site Superintendant		61.99	0.00	0.00	0.00	0.00	61.99	
	8.00 HR	496	0	0	0	0	496	61.99
USR AA Principal Engineer/Scientist I; Project Manager	20.00 HR	91.30 1,826	0.00 0	0.00 0	0.00 0	0.00 0	91.30 1,826	91.30
USR AA Contractors Chem Quality Control Officer	20.00 HR	84.70 1,694	0.00 0	0.00 0	0.00 0	0.00 0	84.70 1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	40.00 HR	84.70 3,388	0.00 0	0.00 0	0.00 0	0.00 0	84.70 3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	4.00 HR	103.40 414	0.00 0	0.00 0	0.00 0	0.00 0	103.40 414	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preliminary Draft - O&M Manua	1.00	EA	23,239	0	0	0	600	23,839	23839.48
3300.25. 5.18. Revised Draft - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	20.00	HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	4.00	HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	8.00	HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	8.00	HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00	EA	7,955	0	0	0	600	8,555	8555.20
3300.25. 5.23. Final - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	8.00	HR	730	0	0	0	0	730	91.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Chem Quality Control Officer	2.00	HR	84.70 169	0.00 0	0.00 0	0.00 0	0.00 0	84.70 169	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	4.00	HR	84.70 339	0.00 0	0.00 0	0.00 0	0.00 0	84.70 339	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	1.00	HR	103.40 103	0.00 0	0.00 0	0.00 0	0.00 0	103.40 103	103.40
USR AA Technician VI - Plant Operator	20.00	HR	35.42 708	0.00 0	0.00 0	0.00 0	0.00 0	35.42 708	35.42
USR AA Engineer/Scientist IV	4.00	HR	59.40 238	0.00 0	0.00 0	0.00 0	0.00 0	59.40 238	59.40
TOTAL Final - O&M Manual	1.00	EA	5,280	0	0	0	600	5,880	5880.00
TOTAL O&M MANUAL	1.00	JOB	40,743	0	0	0	2,300	43,043	43042.68
3300.25.10. STARTUP/COMMISSION TREATMENT SYS									
3300.25.10. 5. ENGINEERS & TECHNICIANS									
USR AA Principal Engineer/Scientist III; Program Mgr.	80.00	HR	103.40 8,272	0.00 0	0.00 0	0.00 0	0.00 0	103.40 8,272	103.40
USR AA Senior Engineer/Scientist II - Startup/Proveout Project Manager	320.00	HR	72.60 23,232	0.00 0	0.00 0	0.00 0	0.00 0	72.60 23,232	72.60
USR AA Principal Engineer/Scientist I; P&ID Checkout	240.00	HR	91.30 21,912	0.00 0	0.00 0	0.00 0	0.00 0	91.30 21,912	91.30
USR AA Principal Engineer/Scientist I; I&E Checkout	80.00	HR	91.30 7,304	0.00 0	0.00 0	0.00 0	0.00 0	91.30 7,304	91.30
USR AA Principal Engineer/Scientist I; PC/MMI Checkout	120.00	HR	91.30 10,956	0.00 0	0.00 0	0.00 0	0.00 0	91.30 10,956	91.30
USR AA Principal Engineer/Scientist I; PC/MMI Programmer	200.00	HR	91.30 18,260	0.00 0	0.00 0	0.00 0	0.00 0	91.30 18,260	91.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; Startup Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Senior Engineer/Scientist IV - Director QA/QC		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Senior Engineer/Scientist II Purchaser		72.60	0.00	0.00	0.00	0.00	72.60	
	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Technician/Analyst IV - Secretary		33.00	0.00	0.00	0.00	0.00	33.00	
	40.00 HR	1,320	0	0	0	0	1,320	33.00
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	80.00 HR	6,776	0	0	0	0	6,776	84.70
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	1120.00 HR	59,506	0	0	0	0	59,506	53.13
USR AA GWTP Plant Operator		43.47	0.00	0.00	0.00	0.00	43.47	
	600.00 HR	26,082	0	0	0	0	26,082	43.47
MIL AA Electricians		35.93	0.00	0.00	0.00	0.00	35.93	
	80.00 HR	2,874	0	0	0	0	2,874	35.93
USR AA Vendor/Manufacturers Reps; Installation and Startup		0.00	0.00	0.00	4000.00	0.00	4000.00	
	8.00 EA	0	0	0	32,000	0	32,000	4000.00
USR AA Site QC/HSO		43.47	0.00	0.00	0.00	0.00	43.47	
	270.00 HR	11,737	0	0	0	0	11,737	43.47
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	172.00 HR	0	0	0	17,372	0	17,372	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	172.00 HR	0	0	0	18,232	0	18,232	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	40.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	20.00 HR	0	0	0	2,860	0	2,860	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	9700.00	0.00	9700.00	
	1.00 LS	0	0	0	9,700	0	9,700	9700.00
TOTAL ENGINEERS & TECHNICIANS	1.00 JOB	220,750	0	0	80,164	0	300,914	300913.96

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.10. TRAVEL & PER DIEM								
USR AA Mileage on Personal Car, Trip s for O&M Proj Mgr from office.	16000 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 4,960	0.31 4,960	0.31
USR AA Apartments for site personnel Mgr and HSO.	8.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	1600.00 12,800	1600.00 12,800	1600.00
USR AA M&IE	120.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	42.00 5,040	42.00 5,040	42.00
USR AA Airfare Trips for Vendor Reps and Instrumentation and Electrical Engineering personnel.	10.00 EA	0.00 0	0.00 0	0.00 0	0.00 0	500.00 5,000	500.00 5,000	500.00
USR AA Rental Car, Total of 4 cars f or two months.	80.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	45.00 3,600	45.00 3,600	45.00
USR AA Parking/Taxi	20.00 EA	0.00 0	0.00 0	0.00 0	0.00 0	20.00 400	20.00 400	20.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	31,800	31,800	31800.00
3300.25.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot hes	1.00 LS	0.00 0	0.00 0	5000.00 5,000	0.00 0	0.00 0	5000.00 5,000	5000.00
USR AA Fork Lift Rental	4.00 MO	0.00 0	1300.00 5,200	0.00 0	0.00 0	200.00 800	1500.00 6,000	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P KUP	640.00 HR	0.00 0	7.52 4,814	0.00 0	0.00 0	0.00 0	7.52 4,814	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	10,014	5,000	0	800	15,814	15814.02
3300.25.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine	2.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	35.00 70	35.00 70	35.00
USR AA Office Drinking Water Service	3.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	75.00 225	75.00 225	75.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	2.00 MO	0	800	0	0	0	800	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	3000.00	0.00	0.00	3000.00	
	2.00 LS	0	0	6,000	0	0	6,000	3000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 MO	0	0	0	400	0	400	200.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	400.00	0.10	400.10	
	2.00 MO	0	0	0	800	0	800	400.10
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	1,600	6,800	1,200	13,395	22,995	22995.20

3300.25.10.26. OPERATING/PROCESS UTILITIES
Assume 1.5 Megawatt-Hrs per day or 62.5 KW per hour @ $0.053/KW.

USR AA Natural Gas, 153 mmbtu/hour @		0.00	0.00	0.00	0.00	514.00	514.00	
1050 btu/scft @ $3.50/MCFT	100.00 HR	0	0	0	0	51,400	51,400	514.00
USR AA Electricity for Electrodes:		0.00	0.00	0.00	0.00	83.30	83.30	
Assume 20 megawatt/day or 833	100.00 HR	0	0	0	0	8,330	8,330	83.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	6.25	6.25	
ent	100.00 HR	0	0	0	0	625	625	6.25
Plant, Steam:								
USR AA Water @ 400 gpm or 24 kgal/ho		0.00	0.00	0.00	0.00	25.60	25.60	
ur	100.00 HR	0	0	0	0	2,560	2,560	25.60
= 32 units/hour @ $0.80								
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	2.00 MO	0	0	0	0	396	396	198.00
TOTAL OPERATING/PROCESS UTILITIES	1.00 JOB	0	0	0	0	63,311	63,311	63311.00
3300.25.10.30. CHEMICALS								
USR AA GAC (Liquid); average useage		0.00	0.00	1.87	0.00	0.00	1.87	
35	1050.00 LB	0	0	1,964	0	0	1,964	1.87
lb/day x 30 days operation								
USR AA GAC (Air); 40 lb/ day x 30 da		0.00	0.00	2.30	0.00	0.00	2.30	
ys	1200.00 LB	0	0	2,760	0	0	2,760	2.30
operation = 1200 lb.								
USR AA Alum		0.00	0.00	2.00	0.00	0.00	2.00	
	1050.00 LB	0	0	2,100	0	0	2,100	2.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10000 LB	0	0	1,500	0	0	1,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Polymer, One 55 gal drum/mo.		0.00	0.00	1.78	0.00	0.00	1.78	
	135.00 LB	0	0	240	0	0	240	1.78
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	1500.00 LB	0	0	60	0	0	60	0.04
TOTAL CHEMICALS	1.00 JOB	0	0	8,624	2,000	0	10,624	10623.80

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filter A		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter B		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter C Cartridges		0.00	0.00	21.20	0.00	0.00	21.20	
	230.00 EA	0	0	4,876	0	0	4,876	21.20
USR AA Filter D		0.00	0.00	6.70	0.00	0.00	6.70	
	24.00 EA	0	0	161	0	0	161	6.70
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	6,109	0	0	6,109	6108.80
3300.25.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	3.00 MO	0	1,350	0	0	0	1,350	450.00
USR AA LEL		0.00	200.00	0.00	0.00	0.00	200.00	
	3.00 MO	0	600	0	0	0	600	200.00
USR AA PPE - Level D Modified		0.00	0.00	2400.00	0.00	0.00	2400.00	
	1.50 MO	0	0	3,600	0	0	3,600	2400.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	1,950	3,600	0	0	5,550	5550.00
3300.25.10.45. DISPOSALS STARTUP								
USR AA Sludge Disposal		0.00	0.00	0.00	420.00	0.00	420.00	
	60.00 DRM	0	0	0	25,200	0	25,200	420.00
USR AA Sludge Waste Characterization - Full TCLP & Waste Char. for Carbon (liquid and vapor) and sludge.		0.00	0.00	0.00	0.00	665.00	665.00	
	2.00 EA	0	0	0	0	1,330	1,330	665.00
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	300.00 GAL	0	0	0	594	0	594	1.98
TOTAL DISPOSALS STARTUP	1.00 JOB	0	0	0	25,794	1,330	27,124	27124.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.50. PERSONNEL TRAINING								
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00 HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	40.00 HR	2,125	0	0	0	0	2,125	53.13
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -		33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00 HR	528	0	0	0	0	528	33.00
USR AA Misc Materials		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00 JOB	8,510	0	500	0	0	9,010	9009.60
3300.25.10.55. SAMPLING/ANALYSIS; STARTUP								
3300.25.10.55.05. DATA VALIDATION								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	27.00 HR	1,604	0	0	0	0	1,604	59.40
TOTAL DATA VALIDATION	1.00 JOB	1,604	0	0	0	0	1,604	1603.80

3300.25.10.55.30. ANALYTICALS PROCESS

Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	13.00 EA	0	0	1,287	0	0	1,287	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	26.00 EA	0	0	131	0	0	131	5.02

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M HTW AA TAL Metals		0.00	0.00	80.00	0.00	0.00	80.00	
	18.00 EA	0	0	1,440	0	0	1,440	80.00
HTW AA TCL VOC (SW-846, 8260B)		0.00	0.00	296.00	0.00	0.00	296.00	
Includes 4 trip blanks.	22.00 EA	0	0	6,512	0	0	6,512	296.00
M HTW AA TPH EPA 418.1		0.00	0.00	120.00	0.00	0.00	120.00	
	18.00 EA	0	0	2,160	0	0	2,160	120.00
HTW AA TCL SVOC (SW-846, 8270C)		0.00	0.00	564.00	0.00	0.00	564.00	
	18.00 EA	0	0	10,152	0	0	10,152	564.00
HTW AA Suspended Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
HTW AA Dissolved Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	280.00	0.00	0.00	280.00	
	18.00 EA	0	0	5,040	0	0	5,040	280.00
TOTAL ANALYTICALS PROCESS	1.00 JOB	0	0	32,124	0	0	32,124	32123.52

3300.25.10.55.40. BOILER AIR EMISSIONS

USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	5.00 EA	0	0	0	1,375	0	1,375	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
USR AA VOC's		0.00	0.00	0.00	60.00	0.00	60.00	
	5.00 EA	0	0	0	300	0	300	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	5.00 EA	0	0	0	175	0	175	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	5.00 EA	0	0	0	500	0	500	100.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Chlorine			0.00	0.00	0.00	40.00	0.00	40.00	
	5.00	EA	0	0	0	200	0	200	40.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	10.00	EA	0	0	990	0	0	990	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	10.00	EA	0	0	50	0	0	50	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	100.00	EA	0	0	1,000	0	0	1,000	10.00
TOTAL BOILER AIR EMISSIONS	1.00	JOB	0	0	2,040	7,500	0	9,540	9540.20
3300.25.10.55.45. VAPOR PH GAC EMISSIONS									
USR AA SVOC's			0.00	0.00	0.00	275.00	0.00	275.00	
	2.00	EA	0	0	0	550	0	550	275.00
USR AA Dioxins/Furans			0.00	0.00	0.00	950.00	0.00	950.00	
	2.00	EA	0	0	0	1,900	0	1,900	950.00
USR AA TPH			0.00	0.00	0.00	60.00	0.00	60.00	
	2.00	EA	0	0	0	120	0	120	60.00
USR AA Metals (Ag, As, Ba, Be)			0.00	0.00	0.00	40.00	0.00	40.00	
	2.00	EA	0	0	0	80	0	80	40.00
USR AA PM			0.00	0.00	0.00	35.00	0.00	35.00	
	2.00	EA	0	0	0	70	0	70	35.00
USR AA HCL			0.00	0.00	0.00	100.00	0.00	100.00	
	2.00	EA	0	0	0	200	0	200	100.00
USR AA Chlorine			0.00	0.00	0.00	40.00	0.00	40.00	
	2.00	EA	0	0	0	80	0	80	40.00
USR AA CO			0.00	0.00	0.00	115.00	0.00	115.00	
	2.00	EA	0	0	0	230	0	230	115.00
USR AA SOx			0.00	0.00	0.00	150.00	0.00	150.00	
	2.00	EA	0	0	0	300	0	300	150.00
USR AA NO2			0.00	0.00	0.00	150.00	0.00	150.00	
	2.00	EA	0	0	0	300	0	300	150.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00	EA	0	0	396	0	0	396	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00	EA	0	0	20	0	0	20	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	25.00	EA	0	0	250	0	0	250	10.00
TOTAL VAPOR PH GAC EMISSIONS	1.00	JOB	0	0	666	3,830	0	4,496	4496.08
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00	JOB	1,604	0	34,830	11,330	0	47,764	47763.60
3300.25.10.60. SOURCE TEST									
USR AA Source Test			0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL SOURCE TEST	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL STARTUP/COMMISSION TREATMENT	1.00	JOB	230,863	13,564	65,462	150,488	110,636	571,014	571013.98
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	271,606	13,564	65,462	150,488	112,936	614,057	614056.66

3300.30. DEMOBILIZATION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30. DEMOBILIZATION								
3300.30.21. DEMOBILIZATION								
3300.30.21.01. Removal of Temp Facilities								
USR AA Demobe Contractor Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer		0.00	0.00	0.00	100.00	0.00	100.00	
	1.00 LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit y Post Abatement Clean Up		187.66	19.73	25.00	0.00	0.00	232.39	
	1.00 EA	188	20	25	0	0	232	232.39
USR AA Removel Water Supply		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Remove Furniture in Temp Off ice		0.00	0.00	0.00	250.00	0.00	250.00	
	1.00 LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Remova l; 01770		284.24	87.95	0.00	0.00	0.00	372.20	
	4.00 AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00 JOB	1,325	372	25	1,450	0	3,171	3171.18
3300.30.21.02. Removal of Temp Utilities								
USR AA Remove Temp Electricity		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL Removal of Temp Utilities	1.00 JOB	0	0	0	10,000	0	10,000	10000.00
3300.30.21.04. Demobe of Construction Equipment								
USR AA Demobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00 JOB	0	0	0	0	1,000	1,000	1000.00
TOTAL DEMOBILIZATION	1.00 JOB	1,325	372	25	11,450	1,000	14,171	14171.18

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22. REPORTS, CLOSEOUT									
3300.30.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	4,356	0	0	0	600	4,956	4956.00
3300.30.22.10. Record Drawings									
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	20.00	EA	0	0	0	0	1,000	1,000	50.00
USR AA Senior Engineer/Scientist I - Draftsman	400.00	HR	67.10 26,840	0.00 0	0.00 0	0.00 0	0.00 0	67.10 26,840	67.10
USR AA Senior Engineer/Scientist II; Site Superintendant	160.00	HR	72.60 11,616	0.00 0	0.00 0	0.00 0	0.00 0	72.60 11,616	72.60
USR AA Construction Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	80.00	HR	7,304	0	0	0	0	7,304	91.30
TOTAL Record Drawings	1.00	JOB	45,760	0	0	0	1,000	46,760	46760.00
3300.30.22.15. Chemical Data Final Report									
USR AA Senior Engineer/Scientist IV - Chem Qual Control Officer	16.00	HR	84.70 1,355	0.00 0	0.00 0	0.00 0	0.00 0	84.70 1,355	84.70
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV; Project Chemist	80.00	HR	84.70 6,776	0.00 0	0.00 0	0.00 0	0.00 0	84.70 6,776	84.70
TOTAL Chemical Data Final Report	1.00	JOB	8,439	0	0	0	600	9,039	9039.20

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30.22.20. Remedial Action Report									
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	100.00	HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	400.00	HR	16,720	0	0	0	0	16,720	41.80
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	400.00	HR	33,880	0	0	0	0	33,880	84.70
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	400.00	HR	19,360	0	0	0	0	19,360	48.40
USR AA ODC's			0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00	LS	0	0	0	0	1,000	1,000	1000.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	80.00	HR	3,080	0	0	0	0	3,080	38.50
TOTAL Remedial Action Report	1.00	JOB	83,380	0	0	0	1,000	84,380	84380.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	141,935	0	0	0	3,200	145,135	145135.20
TOTAL DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL CAPITAL COSTS	1.00	JOB	6,936,675	276,813	10661663	12983418	729,569	31,588,138	31588138.30

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400. 1ST YEAR O&M								
3400. 5. GENERAL CONDITIONS								
3400. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3400. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3400. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3400.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3400.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3400.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3400.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	30000.00	0.00	0.00	30000.00	
	1.00 LS	0	0	30,000	0	0	30,000	30000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	40,080	40,000	0	80,080	6673.33

3400.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU		0.00	0.00	0.00	0.00	3.50	3.50	
@ $3.50	2542586 MBT	0	0	0	0	8,899,051	8,899,051	3.50
USR AA Electricity for Electrodes		0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	32237 KKW	0	0	0	0	1,934,220	1,934,220	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	32237 KKW	0	0	0	0	-1934220	-1,934,220	-60.00
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	15768 KKW	0	0	0	0	946,080	946,080	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	280320 UNT	0	0	0	0	224,256	224,256	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	10076563	10,076,563	839713.58

Table 4-4
Utility Estimates for Different Phases of Operation for Each Scenario

Fresh water usage estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	200	300	400	gpm	100% fresh water					
Continued thermal treatment	Year 2	133	200	267	gpm	67% fresh water					
Continued thermal treatment	Year 3	100	150	200	gpm	50% fresh water					
Continued thermal treatment	Year 4	100	150	200	gpm	50% fresh water					
Cool-down	Year 5	10	15	20	gpm	100% fresh water					
Cool-down	Year 6	10	15	20	gpm	100% fresh water					
Cool-down	Year 7	10	15	20	gpm	100% fresh water					
Treatment system pumping capacity	Maximum	475	575	700	gpm						
Steam generation water demand	Maximum	200	300	400	gpm						
						General process power			Electrical heating demand		
Power consumption estimates		Scenario 1	Scenario 2	Scenario 3		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Heatup	Year 1	3,550	5,080	5,480	kW	1,000	1,400	1,800	2,550	3,680	3,680
Continued thermal treatment	Year 2	3,551	5,080	5,480	kW	1,000	1,400	1,800	2,551	3,680	3,680
Continued thermal treatment	Year 3	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Continued thermal treatment	Year 4	800	1,000	1,200	kW	800	1,000	1,200	0	0	0
Cool-down	Year 5	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 6	500	650	800	kW	500	650	800	0	0	0
Cool-down	Year 7	500	650	800	kW	500	650	800	0	0	0
Max power usage for equipment sizing	Maximum	6,600	9,400	9,900	kW	1,500	2,000	2,500	5,100	7,400	7,400
Natural gas consumption estimates		Scenario 1	Scenario 2	Scenario 3		Comment					
Heatup	Year 1	152,381	228,571	304,762	scfh	80% firing rate in average					
Continued thermal treatment	Year 2	133,333	200,000	266,667	scfh	70% firing rate					
Continued thermal treatment	Year 3	114,286	171,429	228,571	scfh	60% firing rate					
Continued thermal treatment	Year 4	95,238	142,857	190,476	scfh	50% firing rate					
Cool-down	Year 5	0	0	0	scfh	No steam generation					
Cool-down	Year 6	0	0	0	scfh	No steam generation					
Cool-down	Year 7	0	0	0	scfh	No steam generation					

Table 4-5
Estimation of Consumption of Grid Power During Operation

Total power consumption		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	3550	5080	5480	kW
Continued thermal treatment	Year 2	3551	5080	5480	kW
Continued thermal treatment	Year 3	800	1000	1200	kW
Continued thermal treatment	Year 4	800	1000	1200	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Co-generation power available[1]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	2200	3300	4400	kW
Continued thermal treatment	Year 2	1760	2640	3520	kW
Continued thermal treatment	Year 3	1540	2310	3080	kW
Continued thermal treatment	Year 4	1320	1980	2640	kW
Cool-down	Year 5	0	0	0	kW
Cool-down	Year 6	0	0	0	kW
Cool-down	Year 7	0	0	0	kW
Grid power comsumption[2]		Scenario 1	Scenario 2	Scenario 3	
Heatup	Year 1	1350	1780	1080	kW
Continued thermal treatment	Year 2	1791	2440	1960	kW
Continued thermal treatment	Year 3	250	350	500	kW
Continued thermal treatment	Year 4	250	350	500	kW
Cool-down	Year 5	500	650	800	kW
Cool-down	Year 6	500	650	800	kW
Cool-down	Year 7	500	650	800	kW
Recommended minimum service	project	2000	2500	2500	kW
1) Co-generation power rates reduced with scaled down steam injection rates					
2) A minimum of 50% of the general process power is assumed to be provided by grid power					

THE SEATTLE TIMES LOCAL / REGIONAL THURSDAY, JUNE 14, 2001

Expect a cap on electrical rates outside California

P-I STAFF AND NEWS SERVICES

WASHINGTON — Federal regulators are expected next week to expand price restrictions on electricity to include Washington state, according to government officials.

According to congressional and industry sources, the Federal Energy Regulatory Commission on Monday is likely to broaden the caps, which it announced in April. They now apply only to California, and only when low power reserves cause a supply emergency.

The restrictions impose ceilings on how much power generators can charge utilities on the wholesale market.

It is unclear what the effect would be on energy prices in Washington state, but electrical and natural-gas prices in California declined after the April order. Although FERC Chairman Curtis Hebert attributed the drop to the limited price controls, Senate Democrats say the reason for the lower prices is uncertain.

Western lawmakers said expanding the price caps to other states and to non-emergency transactions would be a step in the right direction but would still fall short of the extended price caps for which Sen. Patty Murray, D-Wash., and others have been calling.

"It's encouraging that they are going to wake up and smell the coffee and recognize they have a legal responsibility to assure prices are just and reasonable," said Murray's spokesman, Todd Webster. "Senator Murray is hopeful that FERC will come out of hibernation and address the price gouging."

Murray has been pressing FERC to set a two-year price cap that would not apply to any plants currently under construction "but would tamp down on some of these crazy prices being charged," Webster said.

This week, electrical prices on the spot market in California fell to below $100 a megawatt-hour for the first time this year. Natural-gas prices eased, too. Earlier this year, prices frequently surpassed $300 a megawatt-hour, 10 times what they were in precrisis 1999. A megawatt is enough electricity to serve about 600 homes.

"Our price mitigation plan is working," Hebert said yesterday. However, California officials say it is too early to make that claim.

At a Senate hearing yesterday, Sen. Dianne Feinstein, D-Calif., said the reason for recent price drops is unclear, but that "it now appears" FERC will broaden its April order.

The five-member commission of three Republicans and two Democrats has come under attack from Democrats in Congress and from California Gov. Gray Davis. Davis has criticized the limited price caps, calling them inadequate and full of loopholes; he has also charged FERC with being far too timid in curtailing price gouging in the wholesale Western power markets.

The commission regulates wholesale electrical markets and interstate natural-gas pipelines. Under a 1934 law, it is required to ensure prices are just and reasonable.

Hebert, a Republican named chairman by President Bush in January, defended the agency at an energy forum yesterday but also acknowledged the recent criticism: "We're not the most popular people in town right now."

Also yesterday, several economists told a Senate hearing that temporary price controls, if structured properly, should not impede electrical investments and supplies as Republican lawmakers and the administration have argued.

"It is incorrect that regulation necessarily interferes with supplies," Cornell economist Alfred Kahn, a prominent deregulation advocate, told the Senate Governmental Affairs Committee.

Kahn said that if price caps were temporary, exempted new power plants, and provided sufficient profits, "there will be no shortage of people interested and willing to build new power plants."

"The greatest danger is continued chaos," said Paul Joskow, an economist at the Massachusetts Institute of Technology. He, too, urged some price controls based on costs of production.

Sen. Fred Thompson, R-Tenn., said the economists were painting "a rosy picture." He read letters from several Wall Street analysts who insisted that price controls would be a "recipe for disaster" and make investors reluctant to enter the California power market.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

URS

SEATTLE POST-INTELLIGENCER | THURSDAY, JUNE 14, 2001

NATION

POWER

CONTINUED FROM B 1

in April apply only to California markets in emergency situations.

Peak demand prices for electricity on the Mid-Columbia wholesale market — where Northwest utilities buy power — slid below $100 a megawatt-hour June 6 for the first time this year. At times this month they have dipped as low as $36.80.

That's a far cry from the $500 per megawatt-hour some expected for this time of year or the up to $750 per megawatt-hour paid in December.

Prices for natural gas are also tumbling, hitting $3.46 per million British thermal units for gas traded at the hub at Sumas, Whatcom County, yesterday, down from an unprecedented high of $14.20 in January.

The drop in price this spring has been precipitous, with prices falling 23.4 percent from last month to this month, according to Kelley Doolan, natural-gas market specialist for Platts, a division of McGraw-Hill.

Experts cited a range of factors for the wholesale-price drops:

• Weather is the biggest single reason, as well as the largest wild card in the West Coast energy picture. Unusually cool, wet weather has prevailed in recent weeks throughout the West, cutting the usual demand for air conditioning.

• Decline in demand as a result of conservation. Power consumption is down 6.5 percent in California for the three months ending in May compared with the similar period a year ago, adjusted for differences in the weather, according to the California Energy Commission.

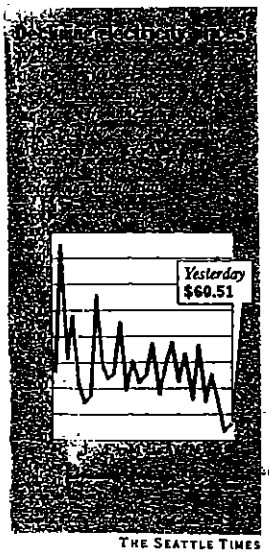
In Washington state, energy experts report a 5 percent reduction in use so far this year. "What we are doing is working," said Ralph Cavanaugh, Northwest energy-program director for the Natural Resources Defense Council an environmental group.

• Decrease in demand by industrial users. Power guzzlers, such as aluminum companies, have unplugged, reducing demand on the grid in the Pacific Northwest.

• Increase in supply. California power plants shut down for spring maintenance in April and May are now back on line for the summer. That put about 15,000 megawatts of generating capacity back on the grid. New power plants have also fired up, including one in Oregon and another in Idaho.

Spring runoff has also added water to Northwest rivers, boosting supply for hydroelectric generation.

Relatively speaking, though,



THE SEATTLE TIMES

wholesale prices for electricity and natural gas are high: gas costs about twice what it did a year and a half ago, and so does electricity. "We are out of the stratosphere, but we haven't landed," said Jim Lazar, an independent energy consultant based in Olympia.

And consumers have yet to see any cut in retail rates.

Gas prices statewide went up by 50 percent this year over last for the average residential customer in response to the jump in wholesale prices.

Electric utilities around the region also raised rates and are forecasting rate increases, not decreases.

While wholesale electricity prices could indeed spike when the water runs low and the temperatures rise, some experts see longer-term relief in natural-gas prices.

Cool weather — which has reduced the demand for power, including gas-fired power generation — has allowed suppliers to put natural gas into storage at record rates.

That means storage could be adequate for the coming winter, Doolan said. New supplies should also be available in time for the coming heating season because of increased drilling.

Electrical supplies from hydropower will also increase if normal rains return to the Northwest this fall. That in turn would decrease reliance on more expensive gas-generated power, dampening the demand and price for natural gas.

Lynda V. Mapes can be reached at 206-464-2736 or lmapes@seattletimes.com.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

John Spear
10/26/01 11:17 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Backup for energy pricing

Harry,

The attached excel file is a summary of our sources for the energy prices from EIA's report. I tried to pull the sections out of the report we want to put in the estimate as backups but they are pdf, gif or some other kinds of files that I can't get into. You will have to go the website or have someone else go there, and find the tables and sections I reference on the spreadsheet. Otherwise I could copy them here and fed ex them to you. I will fax them to you now so you know what they look like.

The website address is: www.eia.doe.gov/oiaf/aeo

I think that will get you there. The tables are mostly in the appendices which have a link in very small print to the left of the text. Table 26 is the only table listed that is in the text itself on page 107.

Jack

Sources for Elec & Gas Prices.:

McCORMICK & BAXTER

10/25/01

SOURCES FOR ASSUMPTIONS FOR NATURAL GAS AND ELECTRICITY PRICING USED IN THE CD ESTIMATES

Annual Energy Outlook 2001 With Projections to 2020
Report #DOE/EIA-0383(2001)
Published by:
Energy Information Administration (EIA)
Office of Integrated Analysis and Forecasting
U.S. Department of Energy

Publication available on the WEB at:
www.eia.doe.gov/oiaf/aeo/

Attached sections and tables of the report:

1. Overview
2. Table 26. Comparison of natural gas forecasts..
3. Table A3. Energy Prices by Sector and Source
4. Table A8. Electricity Supply, Disposition, Prices and Emissions
5. Table A14. Natural Gas Prices, Margins & Revenues (Ref. Case Forecast)
6. Table B14. Natural Gas Prices, Margins & Revenue (Economic Growth Case Comparisons)

From this report the assumptions have been made for the conceptual design estimate as follows:

Natural gas will be available to the site at the price of:	$3.50	per Million Btu
Electricity will be available to the site at the price of :	$0.06	per KW hour

COST IMPACTS OF INCREASED UTILITY RATES

	RATE	UNIT	SCENARIO 1	SCENARIO 2	SCENARIO 3	P&T
GAS						
	$7.00	MMBTU	$20,552,203	$30,813,298	$41,081,657	$0
	$10.00	MMBTU	$38,168,055	$57,224,717	$76,294,566	$0
ELECTRICITY						
	$0.10	KWH	$1,754,725	$2,368,444	$4,181,897	$7,939,200
	$0.30	KWH	$10,491,743	$14,210,649	$19,129,337	$47,638,500

NOTE:

1. Total cost increases are for the life cycle of the project with no present value discount. (7 years for all thermal scenarios and 100 years for the P&T option.)
2. Electricity cost increases for the thermal options assume that co-generation covers cost of electrode power requirements (but not GWTP power) for years 1 & 2 of the heatup and the power requirements of the GWTP for years 3 & 4.
   For years 5 thru 7 of the thermal options the power is from the grid.
3. All power for the P&T option is electrical from the grid (no gas).

John Spear
06/29/01 09:32 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: heron@steamtech.com
Subject: Natural Gas prices for CD estimate - McCormick & Baxter

Harry,

I looked up some reports and projections done by the Energy Information Administration which is within the Dept of Energy. Their report attached which is entitled "US Natural Gas Markets: Recent Trends and Prospects for the Future" talks about the recent spike in gas prices and why they happened. They project (on page 5 of 7 of the Executive Summary) prices to moderate by 2002 to 4.43 per MMBTU. This article is informative but may still be a bit pessimistic. Another publication of the EIA is Table 14 (attached) which projects prices delivered to Industrial Users out to the year 2016. It seems to project pricing in the range of an average of $3.22 to $3.40 per 1000 CFT or about $3.00 to $3.13 per MMBTU over the next 10 years (in 1999 dollars). These are average projections for the whole USA . Another table I got from their website showed average 1999 pricing to Industrial users in California was $3.26 per Thousand CFT while the average for the USA was 3.11. This indicates that the price to California users is somewhat higher than the national average even before the 2000 to 2001 price anomalies kicked in.

In summary I think the rate we are using at $2.50 is unsustainable. Probably could go with the long term projections of Table 14 which would put our price around $3.30 plus about 5% inflation to 2001 or a number at $3.47 or so. (All prices on the Table are 1999 dollars.)

The article, "US Natural Gas Markets.....", is a good justification for not using any of the prices experienced in the last year or so because it explains the breakdown of the El Paso gas line coming into New Mexico and restricting capacity to California and also the reluctance of gas suppliers to sell to PG&E and the other Electricity Co. that was going broke. (The long term projections of Table 14 may even be high because their demand projections include a 3.6% growth or something like that for GDP. I believe the growth of the last year has actually been less than 2%.)

Take a look at the reports and let's adjust the gas costs to something that is probably more in line with government projections. We'd have somewhere to hang our hats at least.

Annual Energy Outlook 2001 - Forecast Comparisons TE> hruler01.gif eialogo3.gif

These files are something of a mystery to me. I saved the files from the doe website but the Table 4 is in the "Annual Energy Outlook 2001..." and the US Natural Gas Markets....." report is the other two files. If you have a problem with them I will fax or give you the website.

Jack

eia Energy Information Administration

Official Energy Statistics from the U.S. Government

Search

by Google: GO

- Energy A-Z
- What's New
- About Us / Jobs
- Press Releases
- Kid's Page
- Publications
- Historical Data
- Sign Up for Email Updates
- Contact Experts
- Energy Links
- Presentations
- Energy Events
- Privacy/Security

How do you want to access energy information?

Click for a text menu

Or would you like to access specific subject areas?

Need Help?

phone: 202-586-8800
email: infoctr@eia.doe.gov
Specialized Information Services
For Technical Problems
phone: 202-586-8959
email: wmaster@eia.doe.gov
Energy Information Administration, EI 30
1000 Independence Avenue, SW
Washington, DC 20585

Home | Petroleum | Gasoline | Diesel | Natural Gas | Electricity | Coal | Nuclear | Renewables
Alternative Fuels | Prices | States | International | Country Analysis Briefs
Environment | Analyses | Forecasts | Processes | Sectors

Page last modified on 06/13/2001 12:25:21

Fea
Status
Califor
Situati
Gasoli
Fuel U
U.S. Na
Market
Trends
Prospe
Future
Short-
Weekl
Status
Natura
Update
Electri
Restru
Energy
Rankin
F
Pu
Recent
Statist
Annual
Projec

DOE/EIA-0383(2001)

Annual Energy Outlook 2001

With Projections to 2020

December 2000

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

This publication is on the WEB at:
www.eia.doe.gov/oiaf/aeo/

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the U.S. Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

For Further Information . . .

The *Annual Energy Outlook 2001* (*AEO2001*) was prepared by the Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, under the direction of Mary J. Hutzler (mhutzler@eia.doe.gov, 202/586-2222), Director, Office of Integrated Analysis and Forecasting; Susan H. Holte (sholte@eia.doe.gov, 202/586-4838), Director, Demand and Integration Division; James M. Kendell (jkendell@eia.doe.gov, 202/586-9646), Director, Oil and Gas Division; Scott Sitzer (ssitzer@eia.doe.gov, 202/586-2308), Director, Coal and Electric Power Division; and Andy S. Kydes (akydes@eia.doe.gov, 202/586-2222), Senior Modeling Analyst.

For ordering information and questions on other energy statistics available from EIA, please contact EIA's National Energy Information Center. Addresses, telephone numbers, and hours are as follows:

National Energy Information Center, EI-30
Energy Information Administration
Forrestal Building
Washington, DC 20585

Telephone: 202/586-8800
FAX: 202/586-0727
TTY: 202/586-1181
9 a.m. to 5 p.m., eastern time, M-F

E-mail: infoctr@eia.doe.gov
World Wide Web Site: http://www.eia.doe.gov/
FTP Site: ftp://ftp.eia.doe.gov/

Specific questions about the information in this report may be directed to:

Overview,	
Carbon Dioxide Emissions	Susan H. Holte (sholte@eia.doe.gov, 202/586-4838)
Economic Activity	Ronald Earley (rearley@eia.doe.gov, 202/586-1398)
International Oil Markets	G. Daniel Butler (gbutler@eia.doe.gov, 202/586-9503)
Residential Demand	John Cymbalsky (jcymbals@eia.doe.gov, 202/586-4815)
Commercial Demand	Erin Boedecker (eboedeck@eia.doe.gov, 202/586-4791)
Industrial Demand	T. Crawford Honeycutt (choneycu@eia.doe.gov, 202/586-1420)
Transportation Demand	David Chien (dchien@eia.doe.gov, 202/586-3994)
Electricity Generation, Capacity	J. Alan Beamon (jbeamon@eia.doe.gov, 202/586-2025)
Electricity Prices	Lori Aniti (laniti@eia.doe.gov, 202/586-2867)
Nuclear Energy	Laura Martin (lmartin@eia.doe.gov, 202/586-1494)
Renewable Energy	Thomas Petersik (tpetersi@eia.doe.gov, 202/586-6582)
Oil and Gas Production	Ted McCallister (tmccalli@eia.doe.gov, 202/586-4820)
Natural Gas Markets	Phyllis Martin (pmartin@eia.doe.gov, 202/586-9592)
Oil Refining and Markets	Stacy MacIntyre (smacinty@eia.doe.gov, 202/586-9795)
Coal Supply and Prices	Michael Mellish (mmellish@eia.doe.gov, 202/586-2136)

AEO2001 will be available on the EIA web site at www.eia.doe.gov/oiaf/aeo/ by December 22, 2000. Assumptions underlying the projections and tables of regional and other detailed results will also be available on December 22, 2000, at web sites www.eia.doe.gov/oiaf/assumption/ and /supplement/. Model documentation reports for the National Energy Modeling System (NEMS) and the report *NEMS: An Overview* are available at web site www.eia.doe.gov/bookshelf/docs.html.

Other contributors to the report include Bruce Bawks, Joseph Benneche, Robert Eynon, Edward Flynn, Mark Friedman, Zia Haq, James Hewlett, Jeff Jones, Diane Kearney, Paul Kondis, Thomas Leckey, Han-Lin Lee, James Lockhart, Chetha Phang, Eugene Reiser, Laurence Sanders, David Schoeberlein, Dan Skelly, Kay Smith, Brian Unruh, Dana Van Wagener, Steven Wade, Peggy Wells, and Thomas White.

Preface

The *Annual Energy Outlook 2001* (*AEO2001*) presents midterm forecasts of energy supply, demand, and prices through 2020 prepared by the Energy Information Administration (EIA). The projections are based on results from EIA's National Energy Modeling System (NEMS).

The report begins with an "Overview" summarizing the *AEO2001* reference case. The next section, "Legislation and Regulations," discusses evolving legislative and regulatory issues. "Issues in Focus" discusses the macroeconomic projections, world oil and natural gas markets, oxygenates in gasoline, distributed electricity generation, electricity industry restructuring, and carbon dioxide emissions. It is followed by the analysis of energy market trends.

The analysis in *AEO2001* focuses primarily on a reference case and four other cases that assume higher and lower economic growth and higher and lower world oil prices than in the reference case. Forecast tables for those cases are provided in Appendixes A through C. Alternative cases explore the impacts of varying key assumptions in NEMS—e.g., technology penetration. The major results for the alternative cases are shown in Appendix F. Appendix G briefly describes NEMS, the *AEO2001* assumptions, and the alternative cases.

The *AEO2001* projections are based on Federal, State, and local laws and regulations in effect on July 1, 2000. Pending legislation and sections of existing legislation for which funds have not been appropriated are not reflected in the forecasts. Historical data used for the *AEO2001* projections were the most current available as of July 31, 2000, when most 1999 data but only partial 2000 data were available. Historical data are presented in this report for comparative purposes; documents referenced in the source notes should be consulted for official data values. The projections for 2000 and 2001 incorporate the short-term projections from EIA's September 2000 *Short-Term Energy Outlook*.

The *AEO2001* projections are used by Federal, State, and local governments, trade associations, and other planners and decisionmakers in the public and private sectors. They are published in accordance with Section 205c of the Department of Energy Organization Act of 1977 (Public Law 95 91), which requires the EIA Administrator to prepare annual reports on trends and projections for energy use and supply.

The projections in *AEO2001* are not statements of what will happen but of what might happen, given the assumptions and methodologies used. The projections are business-as-usual trend forecasts, given known technology, technological and demographic trends, and current laws and regulations. Thus, they provide a policy-neutral reference case that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes. All laws are assumed to remain as currently enacted; however, the impacts of emerging regulatory changes, when defined, are reflected.

Because energy markets are complex, models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior. Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Behavioral characteristics are indicative of real-world tendencies rather than representations of specific outcomes.

Energy market projections are subject to much uncertainty. Many of the events that shape energy markets are random and cannot be anticipated, including severe weather, political disruptions, strikes, and technological breakthroughs. In addition, future developments in technologies, demographics, and resources cannot be foreseen with any degree of certainty. Many key uncertainties in the *AEO2001* projections are addressed through alternative cases.

EIA has endeavored to make these projections as objective, reliable, and useful as possible; however, they should serve as an adjunct to, not a substitute for, analytical processes in the examination of policy initiatives.

The Office of Integrated Analysis and Forecasting dedicates this report in memory of Richard Newcombe (1941-2000). Richard worked on the coal forecasts in past AEOs; his expertise and understanding of the coal industry, as well as his attention to detail, are greatly missed.

Contents

Page

Overview 1
Legislation and Regulations 9
Introduction 10
Nitrogen Oxide Emission Caps 11
FERC Order 2000 11
Updates on State Renewable Portfolio Standards and Renewable Energy Mandates 12
FERC Order 637 12
Royalty Rules 13
Tier 2 Vehicle Emissions and Gasoline Sulfur Standards 14
Heavy-Duty Vehicle Emissions and Diesel Fuel Quality Standards 15
Banning or Reducing the Use of MTBE in Gasoline 15
Proposed Changes to RFG Oxygen Standard 16
Proposed Limits on Benzene in Gasoline 16
Low-Emission Vehicle Program 17
Appliance Efficiency Standards 18
Petroleum Reserves 19
Issues in Focus 21
Macroeconomic Forecasting with the Revised National Income and Product Accounts (NIPA) 22
World Oil Demand and Prices 27
Natural Gas Supply Availability 28
Phasing Out MTBE in Gasoline 35
Distributed Electricity Generation Resources 37
Restructuring of State Retail Markets for Electricity 41
Carbon Dioxide Emissions in *AEO2001* 45
Market Trends 55
Trends in Economic Activity 56
Economic Growth Cases 57
International Oil Markets 58
Energy Demand 61
Residential Sector Energy Demand 63
Commercial Sector Energy Demand 64
Industrial Sector Energy Demand 65
Transportation Sector Energy Demand 67
Energy Demand in Alternative Technology Cases 69
Electricity 72
Electricity Sales 72
Electricity Generating Capacity 73
Electricity Prices 74
Electricity Generation 75
Nuclear Power 76
Electricity Alternative Cases 77
Electricity from Renewable Sources 79
Oil and Natural Gas 81
Oil and Gas Prices 81
Oil and Gas Reserve Additions 82
Natural Gas Production and Imports 83
Natural Gas Consumption 84
Natural Gas Prices 85
Oil and Gas Alternative Cases 86
Oil Production and Consumption 88
Petroleum Imports and Refining 89
Refined Petroleum Products 90

Contents

Market Trends (continued) **Page**

Coal 92
Coal Production and Prices 92
Coal Mining Labor Productivity 93
Coal Transportation Costs 94
Coal Consumption 95
Coal Exports 96
Emissions 97
Carbon Dioxide and Methane Emissions 97
Emissions from Electricity Generation 99

Forecast Comparisons **101**

List of Acronyms **112**

Notes and Sources **113**

Appendixes
A. Reference Case Forecast 127
B. Economic Growth Case Comparisons 155
C. Oil Price Case Comparisons 183
D. Crude Oil Equivalency Summary 211
E. Household Expenditures 213
F. Results from Side Cases 216
G. Major Assumptions for the Forecasts 230
H. Conversion Factors 251

Index **253**

Tables
1. Summary of results for five cases 7
2. Summer season NO_x emissions budgets for 2003 and beyond 11
3. Effective dates of appliance efficiency standards, 1988-2005 18
4. Historical revisions to growth rates of GDP and its major components, 1959-1998 22
5. Revisions to nominal GDP, 1959-1998 23
6. Revisions to nominal GDP for 1998 23
7. Historical growth in GDP, the labor force, productivity and energy intensity 23
8. Forecast comparison of key macroeconomic variables 25
9. Cost and performance of generic distributed generators 38
10. Projected installed costs and electrical conversion efficiencies for distributed generation technologies by year of introduction and technology, 2000-2020 39
11. Costs of industrial cogeneration systems, 1999 and 2020 40
12. New car and light truck horsepower ratings and market shares, 1990-2020 67
13. Costs of producing electricity from new plants, 2005 and 2020 75
14. Technically recoverable U.S. oil and gas resources as of January 1, 1999 81
15. Natural gas and crude oil drilling in three cases, 1999-2020 82
16. Transmission and distribution revenues and margins, 1970-2020 85
17. Components of residential and commercial natural gas end-use prices, 1985-2020 85
18. Petroleum consumption and net imports in five cases, 1999 and 2020 89
19. Forecasts of economic growth, 1999-2020 102
20. Forecasts of world oil prices, 2000-2020 102
21. Forecasts of average annual growth rates for energy consumption 103
22. Forecasts of average annual growth in residential and commercial energy demand 103
23. Forecasts of average annual growth in industrial energy demand 103
24. Forecasts of average annual growth in transportation energy demand 104
25. Comparison of electricity forecasts 105
26. Comparison of natural gas forecasts 107
27. Comparison of petroleum forecasts 109
28. Comparison of coal forecasts 111

Contents

Figures **Page**

1. Fuel price projections, 1999-2020: *AEO2000* and *AEO2001* compared 2
2. Energy consumption by fuel, 1970-2020 4
3. Energy use per capita and per dollar of gross domestic product, 1970-2020 5
4. Electricity generation by fuel, 1970-2020 5
5. Energy production by fuel, 1970-2020 6
6. Net energy imports by fuel, 1970-2020 6
7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 6
8. Index of energy use per dollar of gross domestic product, 1960-1998 24
9. Annual growth in real gross domestic product: 21-year moving average, 1980-2020 24
10. Projected average annual growth in sectoral output, 1999-2020 25
11. Projected commercial delivered energy intensity by fuel, 1999-2020 26
12. Projected industrial energy intensity by fuel, 1999-2020 26
13. Projected new light-duty vehicle and on-road stock fuel efficiency, 1999-2020 27
14. Refiner acquisition cost of imported crude oil, 1997-2000 27
15. World oil supply and demand forecast in the AEO2001 reference case, 1995-2020 28
16. Net U.S. imports of natural gas, 1970-2020 30
17. Lower 48 natural gas wells drilled, 1970-2020 31
18. Technically recoverable U.S. natural gas resources as of January 1, 1999 32
19. Lower 48 end-of-year natural gas reserves, 1990-2020 32
20. Lower 48 natural gas production in three resource cases, 2000-2020 33
21. Average lower 48 natural gas wellhead prices in three resource cases, 2000-2020 33
22. Lower 48 natural gas production in three technology cases, 1970-2020 34
23. Major new U.S. natural gas pipeline systems, 1990-2000 35
24. Projected buildings sector electricity generation by selected distributed resources in the reference case, 2000-2020 40
25. Cogeneration capacity by type and fuel, 1999 and 2020 41
26. Average annual electricity prices for competitive and noncompetitive regions, 1995-2020 43
27. Projected average regional electricity prices, 2000 and 2020 44
28. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 45
29. U.S. carbon dioxide emissions per capita, 1990-2020 45
30. U.S. carbon dioxide emissions per unit of gross domestic product, 1990-2020 46
31. Projected U.S. energy consumption in three economic growth cases, 1990-2020 48
32. Projected U.S. carbon dioxide emissions in three economic growth cases, 1990-2020 49
33. Projected U.S. energy intensity in three economic growth cases, 1990-2020 49
34. Projected U.S. energy intensity in three technology cases, 1990-2020 50
35. Projected U.S. energy consumption in three technology cases, 1990-2020 50
36. Projected U.S. carbon dioxide emissions in three technology cases, 1990-2020 51
37. Projected average annual real growth rates of economic factors, 1999-2020 56
38. Projected sectoral composition of GDP growth, 1999-2020 56
39. Projected average annual real growth rates of economic factors in three cases, 1999-2020 57
40. Annual GDP growth rate for the preceding 21 years, 1970-2020 57
41. World oil prices in three cases, 1970-2020 58
42. OPEC oil production in three cases, 1970-2020 58
43. Non-OPEC oil production in three cases, 1970-2020 59
44. Persian Gulf share of worldwide oil exports in three cases, 1965-2020 59
45. Projected U.S. gross petroleum imports by source, 1999-2020 60
46. Projected worldwide refining capacity by region, 1999 and 2020 60
47. Primary and delivered energy consumption, excluding transportation use, 1970-2020 61
48. Energy use per capita and per dollar of gross domestic product, 1970-2020 61
49. Delivered energy use by fossil fuel and primary energy use for electricity generation, 1970-2020 62
50. Primary energy consumption by sector, 1970-2020 62
51. Residential primary energy consumption by fuel, 1970-2020 63
52. Residential primary energy consumption by end use, 1990, 1997, 2010, and 2020 63

Contents

Figures (continued) **Page**

53. Efficiency indicators for selected residential appliances, 1999 and 2020 64
54. Commercial nonrenewable primary energy consumption by fuel, 1970-2020 64
55. Commercial primary energy consumption by end use, 1999 and 2020 65
56. Industrial primary energy consumption by fuel, 1970-2020 65
57. Industrial primary energy consumption by industry category, 1994-2020 66
58. Industrial delivered energy intensity by component, 1994-2020 66
59. Transportation energy consumption by fuel, 1975, 1999, and 2020 67
60. Projected transportation stock fuel efficiency by mode, 1999-2020 67
61. Projected technology penetration by mode of travel, 2020 68
62. Projected sales of advanced technology light-duty vehicles by fuel type, 2010 and 2020 68
63. Projected variation from reference case primary energy use by sector in two alternative cases, 2010, 2015, and 2020 69
64. Projected variation from reference case primary residential energy use in three alternative cases, 2000-2020 69
65. Projected cost and investment for selected residential appliances in the best available technology case, 2000-2020 70
66. Present value of investment and savings for residential appliances in the best available technology case, 2000-2020 70
67. Projected variation from reference case primary commercial energy use in three alternative cases, 2000-2020 70
68. Projected industrial primary energy intensity in two alternative cases, 1994-2020 71
69. Projected changes in key components of the transportation sector in two alternative cases, 2020 . . 71
70. Population, gross domestic product, and electricity sales, 1965-2020 72
71. Annual electricity sales by sector, 1970-2020 72
72. Projected new generating capacity and retirements, 2000-2020 73
73. Projected electricity generation capacity additions by fuel type, including cogeneration, 2000-2020 73
74. Fuel prices to electricity generators, 1990-2020 74
75. Average U.S. retail electricity prices, 1970-2020 74
76. Projected electricity generation costs, 2005 and 2020 75
77. Projected electricity generation by fuel, 1999 and 2020 75
78. Nuclear power plant capacity factors, 1973-2020 76
79. Projected operable nuclear capacity in three cases, 1995-2020 76
80. Projected electricity generation costs by fuel type in two advanced nuclear cost cases, 2005 and 2020 77
81. Projected cumulative new generating capacity by type in two cases, 1999-2020 77
82. Projected cumulative new generating capacity by technology type in three economic growth cases, 1999-2020 78
83. Projected cumulative new generating capacity by technology type in three fossil fuel technology cases, 1999-2020 78
84. Grid-connected electricity generation from renewable energy sources, 1970-2020 79
85. Projected nonhydroelectric renewable electricity generation by energy source, 2010 and 2020 79
86. Projected nonhydroelectric renewable electricity generation by energy source in two cases, 2020 . . 80
87. Wind-powered electricity generating capacity in two cases, 1985-2020 80
88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 81
89. U.S. petroleum consumption in five cases, 1970-2020 81
90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 81
91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 82
92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 82
93. Lower 48 crude oil reserve additions in three cases, 1970-2020 82
94. Natural gas production by source, 1990-2020 83
95. Natural gas production, consumption, and imports, 1970-2020 83
96. Natural gas consumption by sector, 1990-2020 84

Figures (continued)

Page

97. Projected pipeline capacity expansion by Census division, 1999-2020 84
98. Projected pipeline capacity utilization by Census division, 1999 and 2020 84
99. Natural gas end-use prices by sector, 1970-2020 85
100. Wellhead share of natural gas end-use prices by sector, 1970-2020 85
101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 86
102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 86
103. Lower 48 crude oil production in three technology cases, 1970-2020 87
104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 87
105. Crude oil production by source, 1970-2020 88
106. Petroleum supply, consumption, and imports, 1970-2020 88
107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 89
108. Domestic refining capacity in three cases, 1975-2020 89
109. Petroleum consumption by sector, 1970-2020 90
110. Consumption of petroleum products, 1970-2020 90
111. U.S. ethanol consumption, 1993-2020 91
112. Components of refined product costs, 1999 and 2020 91
113. Coal production by region, 1970-2020 92
114. Average minemouth price of coal by region, 1990-2020 92
115. Coal mining labor productivity by region, 1990-2020 92
116. Labor cost component of minemouth coal prices, 1970-2020 93
117. Average minemouth coal prices in three mining cost cases, 1990-2020 93
118. Projected change in coal transportation costs in three cases, 1999-2020 94
119. Projected variation from reference case projections of coal demand in two economic growth cases, 2020 94
120. Electricity and other coal consumption, 1970-2020 95
121. Projected coal consumption in the industrial and buildings sectors, 2010 and 2020 95
122. Projected U.S. coal exports by destination, 2010 and 2020 96
123. Projected coal production by sulfur content, 2010 and 2020 96
124. Projected carbon dioxide emissions by sector, 2000, 2010, and 2020 97
125. Projected carbon dioxide emissions by fuel, 2000, 2010, and 2020 97
126. Projected carbon dioxide emissions from electricity generation by fuel, 2000, 2010, and 2020 98
127. Projected methane emissions from energy use, 2005-2020 98
128. Projected sulfur dioxide emissions from electricity generation, 2000-2020 99
129. Projected nitrogen oxide emissions from electricity generation, 2000-2020 99

Overview

Key Energy Issues to 2020

Currently, most attention in energy markets is focused on near-term issues of world oil supply and prices, U.S. natural gas prices, and the transition to restructured electricity markets in several regions of the country. The *Annual Energy Outlook 2001* (*AEO2001*) addresses the longer-term trends of electricity industry restructuring, fossil fuel supply and prices, and the impacts of economic growth on projected energy use and carbon dioxide emissions. *AEO2001* does not project short-term events, such as supply disruptions or severe weather.

The *AEO2001* projections assume a transition to full competitive pricing of electricity in States with specific deregulation plans—California, New York, New England, the Mid-Atlantic States, Illinois, Texas, Oklahoma, Michigan, Ohio, Arizona, New Mexico, and West Virginia. Other States are assumed to continue cost-of-service electricity pricing. A transition from regulated to competitive prices over a 10-year period from the beginning of restructuring in each region, and implementation of the provisions of California legislation regarding price caps, are assumed. Increased competition in electricity markets is also represented through assumed changes in the financial structure of the industry and efficiency and operating improvements.

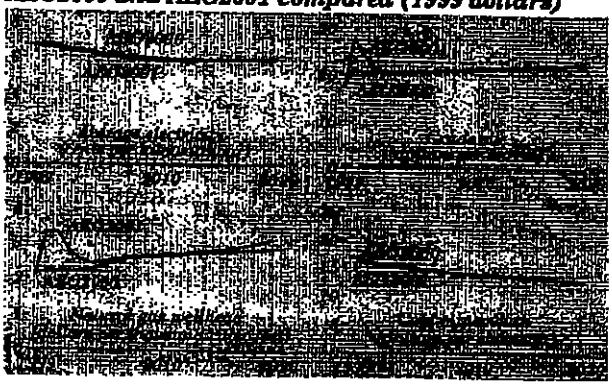
World oil prices fell sharply through most of 1997 and 1998, due in part to economic developments in East Asia and the resulting oversupply of oil. Beginning in 1999, actions by the Organization of Petroleum Exporting Countries (OPEC) and some non-OPEC countries to restrain oil production have increased world oil prices. U.S. natural gas prices have also increased in 2000 due to higher than expected demand and to tight supplies caused by reduced drilling in reaction to low prices in 1998. Oil and gas markets are addressed on pages 27 and 28.

The projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in *AEO2001* than in *AEO2000*, an average annual rate of 3.0 percent from 1999 to 2020, compared with 2.1 percent in *AEO2000*. Although part of the upward revision results from statistical and definitional changes in the National Income and Product Accounts, the projections also reflect a more optimistic view of long-run economic growth, which results in higher forecasts of energy consumption and carbon dioxide emissions in *AEO2001* than in *AEO2000*. The macroeconomic projections are discussed on pages 22 and 56.

Prices

The average world oil price is projected to increase from $17.35 per barrel in 1999 (1999 dollars) to about $27.60 per barrel in 2000, falling to about $20.50 per barrel by 2003. In 2020, the projected price reaches $22.41 per barrel (Figure 1), similar to the *AEO2000* projection of $22.33 per barrel. Higher demand in the forecast is offset by higher resource estimates from the U.S. Geological Survey. Projected prices over the next several years are higher in *AEO2001* than in *AEO2000* due to the production cutbacks by OPEC and several non-OPEC nations, a lag in the response of non-OPEC producers to price increases, and renewed demand growth in Asia.

Figure 1. Fuel price projections, 1999-2020: AEO2000 and AEO2001 compared (1999 dollars)



World oil demand is projected to increase from 75.5 million barrels per day in 1999 to 117.4 million barrels per day in 2020—higher than the *AEO2000* projection of 112.4 million barrels per day—due to higher projected demand in the United States, the Middle East, the former Soviet Union, the Pacific Rim developing countries, and China. Projected growth in production in both OPEC and non-OPEC nations leads to relatively slow projected growth of prices through 2020. OPEC oil production is expected to reach 57.6 million barrels per day in 2020, nearly double the 29.9 million barrels per day in 1999, assuming sufficient capital to expand production capacity. The United Nations resolution limiting Iraqi oil exports is assumed to remain in place through 2001. Once sanctions are lifted, Iraqi oil production is expected to reach 3.5 million barrels per day within 2 years and about 5 million barrels per day within a decade.

The June 2000 recoverable oil resources assessment by the U.S. Geological Survey raised world resources by about 700 billion barrels from the 1994 assessment. As a result, non-OPEC oil production is expected to increase from 44.8 million barrels per day to 59.5 million barrels per day between 1999 and 2020, or 2.9 million barrels per day higher than in *AEO2000*. Production from the Caspian Basin is expected to reach 6 million barrels per day by 2020 with continued expansion of production from the offshore regions of West Africa and the North Sea. Both Brazil and Colombia are expected to be producing 1 million barrels per day before 2005, and production in Mexico and Canada is also expected to increase.

The average wellhead price of natural gas is projected to increase from $2.08 per thousand cubic feet in 1999 to about $3.30 per thousand cubic feet in 2000 and 2001, then decline through 2004. The projected price reaches $3.13 per thousand cubic feet in 2020, $0.28 per thousand cubic feet higher than in *AEO2000*, due to higher projected demand. Price increases are expected to be slowed by technological improvements in natural gas exploration and production. Average delivered prices are projected to increase at a slower rate than the wellhead price due to assumed cost reductions from efficiency improvements in the industry.

In *AEO2001*, the average minemouth price of coal is projected to decline from $16.98 per ton in 1999 to $12.70 per ton in 2020, the same price projected in *AEO2000*. Through 2020, the price is expected to decline due to increasing productivity in mining, a shift to lower-cost western production, and competitive pressures on labor costs.

Average electricity prices are projected generally to decline from 6.7 cents per kilowatthour in 1999 to 6.0 cents in 2020, increasing slightly at the end of the forecast due to rising natural gas prices. In 2020, the projected price is slightly higher than the 5.9 cents per kilowatthour projected in *AEO2000*. Higher projections for natural gas prices and for electricity demand—which would require more investment in new generating capacity—lead to the higher price projections. Electricity industry restructuring is expected to contribute to lower prices through reductions in operating and maintenance, administrative, and other costs. Federal Energy Regulatory Commission actions on open access and other changes for competitive markets enacted by some State public utility commissions are included in the projections, as noted above. Because not all States have deregulated their electricity markets, the projections do not represent a fully restructured electricity market. State legislative actions to deregulate the electricity industry are discussed on page 41.

Consumption

Total energy consumption is projected to increase from 96.1 quadrillion British thermal units (Btu) to 127.0 quadrillion Btu between 1999 and 2020, an average annual increase of 1.3 percent. In 2020, this forecast is about 6 quadrillion Btu higher than projected in *AEO2000*, primarily because higher projected economic growth leads to higher demand forecasts in all end-use sectors.

Total residential energy consumption is projected to grow at an average rate of 1.2 percent per year, with the most rapid growth expected for computers, electronic equipment, and appliances. In 2020, the projected residential demand is 24.4 quadrillion Btu, 1.4 quadrillion Btu higher than in *AEO2000*. Higher projected economic growth results in higher forecasts for both disposable personal income and housing starts, increasing equipment purchases and raising the projected housing stock in 2020 by 1.5 percent. *AEO2001* also forecasts that new houses will become larger over time.

Commercial energy demand is projected to grow at an average annual rate of 1.4 percent, reaching 20.8 quadrillion Btu in 2020, 2.6 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth in *AEO2001*, commercial floorspace is projected to grow more rapidly and, in 2020, is estimated to be 11 percent higher than projected in *AEO2000*. The most rapid increases in energy use are expected for computers, office equipment, and telecommunications and other equipment.

Industrial energy demand is projected to increase at an average rate of 1.0 percent per year, reaching 43.4 quadrillion Btu in 2020, 1.2 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth, total industrial gross output is estimated to grow at an average annual rate of 2.6 percent from 1999 to 2020, compared with 1.9 percent in *AEO2000*; however, recent data indicate more rapid improvements in industrial energy intensity than previously estimated. Also, average annual growth in non-energy-intensive manufacturing is expected to be 3.3 percent, compared with 1.2 percent for energy-intensive manufacturing. Through 2020,

more rapid assumed declines in industrial energy intensity, compared with *AEO2000*, are projected to offset some of the increase in demand that might be expected with higher industrial output. Cogeneration capacity is projected to increase by 19 gigawatts by 2020, 10 gigawatts more than in *AEO2000*.

Energy demand for transportation is projected to grow at an average annual rate of 1.8 percent, to 38.5 quadrillion Btu in 2020, 1.0 quadrillion Btu higher than in *AEO2000*. In *AEO2001*, the projections for light-duty vehicle and freight travel are higher than in *AEO2000* as a result of higher projected growth in personal income and industrial output. Higher light-duty vehicle travel in the forecast is partially offset by higher vehicle efficiency. New vehicle efficiency in 2020 is projected to be higher by 0.9 and 1.9 miles per gallon for new cars and light trucks, respectively, than in *AEO2000*, due to a reevaluation of the competitive potential of advanced technology vehicles.

The projections incorporate efficiency standards for new energy-using equipment in buildings and for motors mandated through 1994 by the National Appliance Energy Conservation Act of 1987 and the Energy Policy Act of 1992, including the refrigerator and fluorescent lamp ballast standards that become effective in July 2001 and April 2005, respectively. These are the only standards that are finalized with effective dates and specific efficiency levels.

Electricity demand is projected to grow by 1.8 percent per year from 1999 through 2020, higher than the rate of 1.3 percent forecast for the same period in *AEO2000*. The higher demand projection results from higher projected economic growth and a reevaluation of the potential for growth in electricity use for a variety of residential and commercial appliances and equipment, including personal computers.

The overall demand for natural gas in the U.S. energy economy is projected to grow by 2.3 percent per year on average (Figure 2), from 21.4 trillion cubic feet in 1999 to 34.7 trillion cubic feet in 2020, primarily as a result of rapid projected growth in demand for electricity generation (excluding cogenerators), which is expected to triple between 1999 and 2020. The *AEO2001* forecast for total natural gas demand in 2020 is 3.2 trillion cubic feet higher than in *AEO2000*, mainly as a result of higher projected demand for natural gas in the electricity generation sector.

In *AEO2001*, total coal consumption is projected to increase from 1,035 million tons in 1999 to 1,297 million tons in 2020, an average increase of 1.1 percent per year. The 2020 projection is 18 million tons higher than in *AEO2000*, due to higher projected demand for industrial uses and for electricity generation, which constitutes about 90 percent of the demand for coal.

Petroleum demand is projected to grow from 19.5 million barrels per day in 1999 to 25.8 million in 2020—an average rate of 1.3 percent per year—led by growth in the transportation sector, which accounts for about 70 percent of U.S. petroleum consumption. Projected demand in 2020 is higher than in *AEO2000* by 730 thousand barrels per day primarily due to a higher projection for transportation fuel use.

Renewable fuel consumption, including ethanol for gasoline blending, is projected to grow at an average rate of 1.1 percent per year through 2020, primarily as a result of State mandates. In 2020, about 55 percent of renewables are used for electricity generation and the rest for dispersed heating and cooling, industrial uses (including cogeneration), and fuel blending. The *AEO2001* forecast for renewable energy demand in 2020 is 0.4 quadrillion Btu higher than in *AEO2000*, mainly due to higher projected use of biomass in the industrial sector.

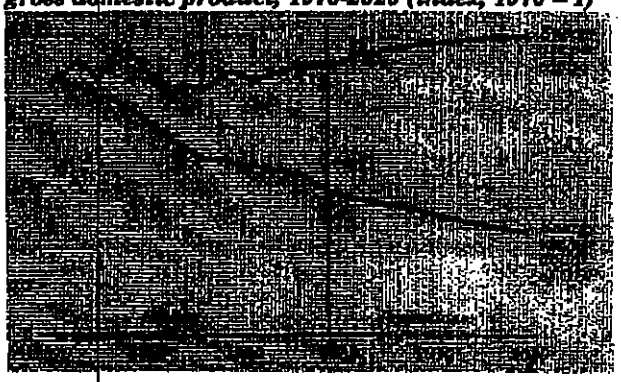
Figure 2. Energy consumption by fuel, 1970-2020 (quadrillion Btu)

Energy Intensity

Between 1970 and 1986, energy intensity, measured as energy use per dollar of GDP, declined at an average annual rate of 2.3 percent as the economy shifted to less energy-intensive industries and more efficient technologies in light of energy price increases (Figure 3). With slower price increases (and price

declines in some sectors) and growth of more energy-intensive industries, intensity declines moderated to an average of 1.3 percent per year between 1986 and 1999. Energy intensity is projected to decline at an average annual rate of 1.6 percent through 2020 as efficiency gains and structural shifts in the economy offset the expected growth in demand for energy services. The projected improvement is more rapid than in *AEO2000*, due to more rapid projected efficiency improvements in the industrial sector and growth in the non-energy-intensive industries.

Figure 3. Energy use per capita and per dollar of gross domestic product, 1970-2020 (index, 1970 = 1)



Energy use per person generally declined from 1970 through the mid-1980s, then rose as energy prices fell. Per capita energy use is projected to increase slightly in the forecast as efficiency gains only partially offset higher demand for energy services.

Electricity Generation

Electricity generation fueled by natural gas and coal is projected to increase through 2020 to meet growing demand for electricity and offset the projected retirement of existing nuclear units (Figure 4). The *AEO2001* projections for generation from natural gas, coal, and nuclear power are higher than in *AEO2000* as a result of higher projected electricity demand and improved operating costs and performance of nuclear plants. The share of natural gas generation is projected to increase from 16 percent in 1999 to 36 percent in 2020, and the coal share is projected to decline from 51 percent to 44 percent, because electricity industry restructuring favors the less capital-intensive and more efficient natural gas generation technologies.

Nuclear generating capacity is projected to decline from 1999 to 2020 but remains higher than in *AEO2000* due to a reevaluation of the costs of life extension and higher projected natural gas prices. Retirements of nuclear plants in the forecast are based on operating and life extension costs compared with the cost of new generating capacity. Of the 97 gigawatts of nuclear capacity available in 1999, 26 gigawatts is projected to be retired by 2020, and no new plants are expected to be constructed by 2020.

The use of renewable energy technologies for electricity generation is projected to grow slowly because of the relatively low costs of fossil-fired generation and because electricity restructuring favors less capital-intensive natural gas technologies over coal and baseload renewables. Where enacted, State renewable portfolio standards, which specify a minimum share of generation or sales from renewable sources, contribute to the expected growth of renewables. Total renewable generation, including cogenerators, is projected to increase by 0.7 percent per year and is similar to the projection in *AEO2000*.

Figure 4. Electricity generation by fuel, 1970-2020 (billion kilowatthours)

Production and Imports

U.S. crude oil production is projected to decline at an average annual rate of 0.7 percent from 1999 to 2020, to 5.1 million barrels per day. Advances in exploration and production technologies do not offset declining oil resources. This forecast is 0.2 million barrels per day lower in 2020 than in *AEO2000*. Projected production is higher in the earlier years of the forecast when projected prices are higher, contributing to lower production later. Projected increases in natural gas plant liquids production and refinery gains generally offset the decline in crude oil production (Figure 5). The share of petroleum demand met by net imports is projected to increase from 51 percent in 1999 (measured in barrels per day) to 64 percent in 2020, the same as in *AEO2000*, due to rising demand (Figure 6).

Figure 5. Energy production by fuel, 1970-2020 (quadrillion Btu)

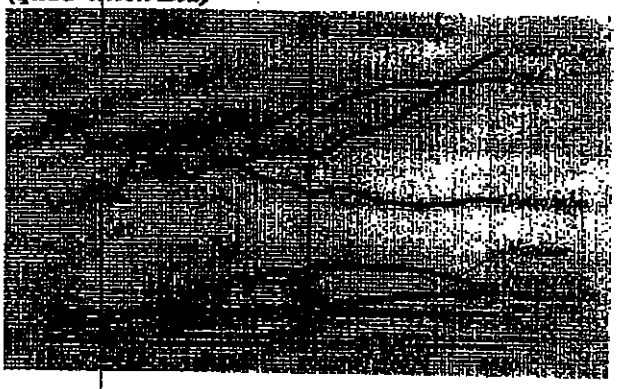


Figure 6. Net energy imports by fuel, 1970-2020 (quadrillion Btu)

U.S. natural gas production is projected to increase from 18.7 trillion cubic feet in 1999 to 29.0 trillion cubic feet in 2020, an average annual rate of 2.1 percent, due to growing demand. Projected production is 2.6 trillion cubic feet higher in 2020 than in *AEO2000*. Net imports of natural gas, primarily from Canada, are projected to increase from 3.4 trillion cubic feet in 1999 to 5.8 trillion cubic feet in 2020. Net imports of liquefied natural gas are expected to increase to 0.7 trillion cubic feet by 2020 as two facilities in the United States—Elba Island, Georgia, and Cove Point, Maryland—are expected to reopen in 2003.

Coal production is projected to increase at an average annual rate of 0.9 percent, from 1,105 million tons in 1999 to 1,331 million tons in 2020, as projected domestic demand grows. Projected production in 2020 is 15 million tons higher than in *AEO2000*, due to higher demand. U.S. net coal exports are projected to decline through 2020, with European demand for U.S. coal expected to decline for environmental reasons and as a result of competition from other producers.

Renewable energy production is projected to increase from 6.6 quadrillion Btu in 1999 to 8.3 quadrillion Btu in 2020, with growth in geothermal, wind, biomass, and landfill gas generation, industrial biomass, and ethanol. Renewables production in 2020 is estimated to be 0.3 quadrillion Btu higher than in *AEO2000*, as a result of higher expected use of biomass in the industrial sector.

Carbon Dioxide Emissions

Carbon dioxide emissions from energy use are projected to increase at an average rate of 1.4 percent per year from 1,511 to 2,041 million metric tons carbon equivalent between 1999 and 2020 (Figure 7). Projected emissions in 2020 are higher by 62 million metric tons carbon equivalent than in *AEO2000*, due mainly to higher projected economic growth. Higher projected growth in households, commercial floorspace, industrial output, and disposable income leads to higher forecasts for end-use demand and electricity generation. Partly offsetting these trends are more rapid projected declines in industrial energy intensity and higher projected nuclear generation than in *AEO2000*.

Figure 7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 (million metric tons carbon equivalent)

The projections do not include future legislative or regulatory actions that might be taken to reduce carbon dioxide emissions but do include certain voluntary actions to reduce energy demand and emissions. Carbon dioxide emissions and international negotiations for emissions reductions are discussed on pages 45 and 97.

Table 1. Summary of results for five cases

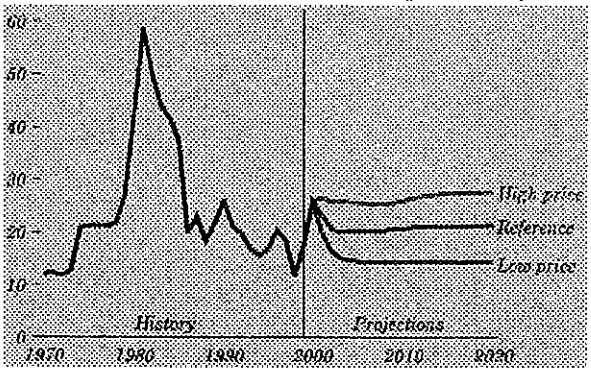
Sensitivity Factors	1998	1999	2020 Reference	2020 Low Economic Growth	2020 High Economic Growth	2020 Low World Oil Price	2020 High World Oil Price
Primary Production (quadrillion Btu)							
Petroleum	15.68	15.08	14.79	14.08	15.42	13.21	16.34
Natural Gas	19.19	19.16	29.79	27.44	31.17	28.99	29.80
Coal	23.76	23.09	26.95	25.97	29.42	26.20	27.66
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.62	6.58	8.31	7.91	8.75	8.19	8.37
Other	0.65	1.65	0.34	0.32	0.34	0.33	0.40
Total Primary Production	**73.10**	**73.35**	**86.30**	**81.64**	**91.40**	**83.02**	**88.67**
Net Imports (quadrillion Btu)							
Petroleum (including SPR)	20.95	21.12	35.22	32.18	38.76	39.57	32.38
Natural Gas	3.06	3.46	5.94	5.72	5.96	5.87	5.56
Coal/Other (- indicates export)	-1.41	-0.85	-0.47	-0.52	-0.36	-0.47	-0.47
Total Net Imports	**22.60**	**23.73**	**40.69**	**37.38**	**44.36**	**44.97**	**37.57**
Discrepancy	0.86	0.94	-0.04	0.05	-0.10	0.60	-0.17
Consumption (quadrillion Btu)							
Petroleum Products	37.16	38.03	50.59	46.73	54.82	52.74	49.49
Natural Gas	21.96	21.95	35.57	33.00	36.97	34.68	35.31
Coal	21.61	21.43	26.20	25.19	28.77	25.45	26.92
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.63	6.59	8.31	7.92	8.76	8.20	8.38
Other	0.29	0.34	0.23	0.23	0.23	0.23	0.23
Total Consumption	**94.84**	**96.14**	**127.03**	**118.98**	**135.86**	**127.39**	**126.42**
Prices (1999 dollars)							
World Oil Price (dollars per barrel)	12.02	17.35	22.41	21.16	23.51	15.10	28.42
Domestic Natural Gas at Wellhead (dollars per thousand cubic feet)	2.02	2.08	3.13	2.66	3.58	3.01	3.25
Domestic Coal at Minemouth (dollars per short ton)	18.02	18.98	12.70	12.79	12.80	12.84	12.87
Average Electricity Price (cents per kilowatthour)	6.8	6.7	6.0	5.6	6.4	5.9	6.1
Economic Indicators							
Real Gross Domestic Product (billion 1996 dollars)	8,516	8,876	16,515	14,757	18,202	16,565	16,474
(annual change, 1999-2020)	—	—	3.0%	2.5%	3.5%	3.0%	3.0%
GDP Chain-Type Price Index (index, 1996=1.00)	1.029	1.045	1.680	1.907	1.472	1.674	1.686
(annual change, 1999-2020)	—	—	2.3%	2.9%	1.6%	2.3%	2.3%
Real Disposable Personal Income (billion 1996 dollars)	6,165	6,363	11,842	10,907	12,739	11,902	11,786
(annual change, 1999-2020)	—	—	3.0%	2.6%	3.4%	3.0%	3.0%
Gross Manufacturing Output (billion 1992 dollars)	3,704	3,749	6,726	6,149	7,735	6,730	6,724
(annual change, 1999-2020)	—	—	2.8%	2.4%	3.5%	2.8%	2.8%
Energy Intensity							
(thousand Btu per 1996 dollar of GDP)	11.14	10.84	7.70	8.07	7.47	7.69	7.68
(annual change, 1999-2020)	—	—	-1.6%	-1.4%	-1.8%	-1.6%	-1.6%
Carbon Dioxide Emissions							
(million metric tons carbon equivalent)	1,495	1,511	2,041	1,916	2,193	2,051	2,033
(annual change, 1999-2020)	—	—	1.4%	1.1%	1.8%	1.5%	1.4%

Notes: Specific assumptions underlying the alternative cases are defined in the Economic Activity and International Oil Markets sections beginning on page 56. Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, supplemental natural gas, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. Some refinery inputs appear as petroleum product consumption. Other consumption includes net electricity imports, liquid hydrogen, and methanol.

Sources: Tables A1, A19, A20, B1, B19, B20, C1, C19, and C20.

Oil Prices Are Expected To Remain Above Low 1998 Levels

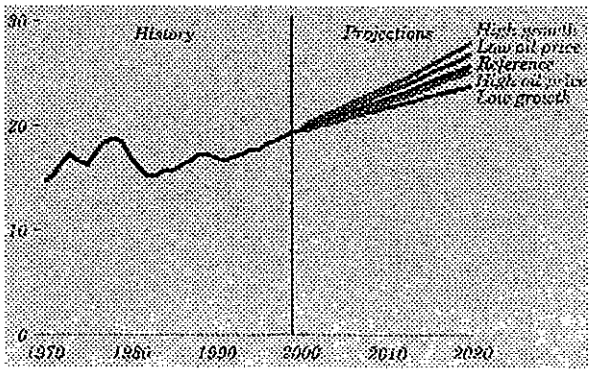
Figure 88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 (1999 dollars per barrel)



Because domestic prices for crude oil are determined largely by the international market, recovery from the 1998 decline in world oil prices led to a steep increase in wellhead prices for crude oil in the lower 48 States in 1999 and 2000. After 2000, prices are projected to decline initially, then increase through the rest of the forecast. Prices are expected to remain above 1998 levels in all cases, with wellhead prices projected to decrease by 0.6 percent per year on average from 1999 to 2020 in the low world oil price case and to increase by 1.3 and 2.5 percent per year on average in the reference and high world oil price cases, respectively (Figure 88).

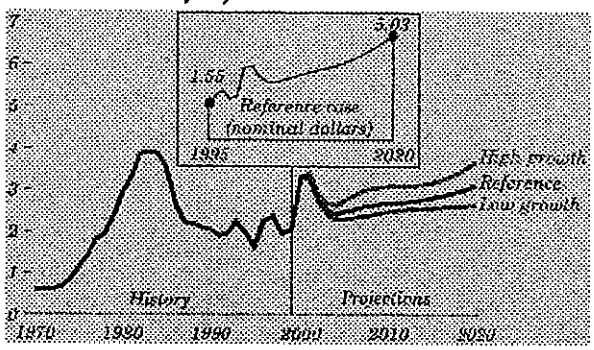
U.S. petroleum consumption is projected to rise in all the *AEO2001* cases (Figure 89). Total petroleum product supplied is projected to range from 23.8 million barrels per day in the low economic growth case to 28.0 million in the high growth case, as compared with 19.5 million barrels per day in 1999.

Figure 89. U.S. petroleum consumption in five cases, 1970-2020 (million barrels per day)



Rising Demand Increases Natural Gas Prices in All Economic Growth Cases

Figure 90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 (1999 dollars per thousand cubic feet)



Wellhead prices for natural gas in the lower 48 States are projected to increase on average by 1.2, 2.0, and 2.8 percent per year in the low economic growth, reference, and high economic growth cases, respectively (Figure 90). In the reference case, gas prices are projected to increase from $2.08 per thousand cubic feet in 1999 to $3.13 in 2020. The increases reflect the rising demand projected for natural gas and its expected impact on the natural progression of the discovery process from larger and more profitable fields to smaller, less economical ones. The projected price increases also reflect more production expected from higher cost sources, such as unconventional gas recovery. Growth in lower 48 unconventional gas production is projected to range from 2.5 to 3.5 percent per year across cases, compared with a projected range of 2.3 to 2.7 percent per year for conventional sources. Technically recoverable resources (Table 14) are expected to remain more than adequate overall to meet the projected production increases.

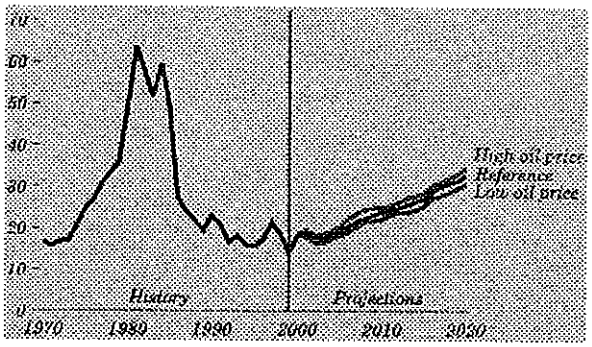
Although natural gas consumption (and thus production and prices) is projected to rise in all three cases, the price increases are expected to be tempered by the beneficial impacts of technological progress on both the discovery process and production operations.

Table 14. Technically recoverable U.S. oil and gas resources as of January 1, 1999

Total U.S. resources	Crude oil (billion barrels)	Natural gas (trillion cubic feet)
Proved	22	164
Unproved	121	1,117
Total	144	1,281

Rising Prices and Lower Drilling Costs Increase Well Completions

Figure 91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 (thousand successful wells)



Both exploratory drilling and developmental drilling are projected to increase in the forecast (Table 15). With rising prices and declining drilling costs, crude oil and natural gas well completions are projected to increase on average by 3.7 and 4.3 percent per year in the low and high oil price cases, respectively, compared with 4.0 percent in the reference case (Figure 91). The high growth rates projected for oil and gas drilling reflect, in part, the low level of drilling activity in 1999.

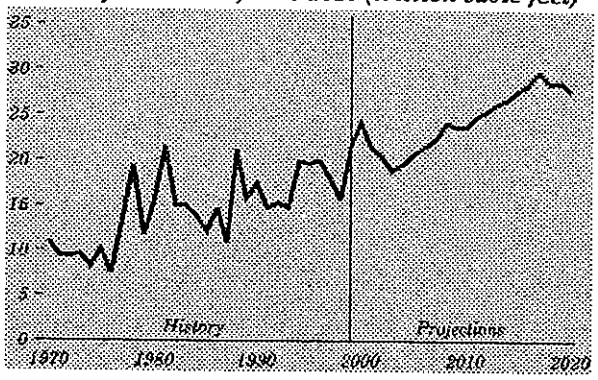
The productivity of natural gas drilling is not expected to decline as much as that of oil drilling, in part because total recoverable gas resources are more abundant than oil resources. At the projected production levels, however, undiscovered recoverable resources of conventional natural gas would decline rapidly in some areas, particularly in the onshore Gulf Coast and offshore Gulf of Mexico regions. The future overall productivity of both oil and gas drilling is necessarily uncertain, given the uncertainty associated with such factors as the extent of the Nation's oil and gas resources [*87*].

Table 15. Natural gas and crude oil drilling in three cases, 1999-2020 (thousand successful wells)

	1999	2000	2010	2020
Natural gas				
Low oil price case		12.8	16.5	22.2
Reference case	10.3	12.8	17.5	23.4
High oil price case		13.0	18.1	24.3
Crude oil				
Low oil price case		5.5	5.8	8.5
Reference case	4.1	5.5	6.5	9.4
High oil price case		5.5	7.0	10.2

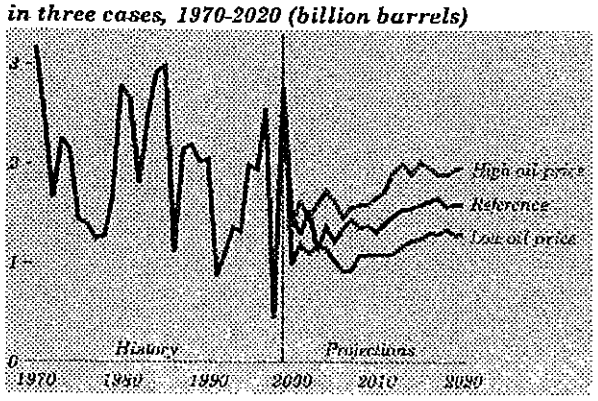
High Levels of Gas Reserve Additions Are Projected Through 2020

Figure 92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 (trillion cubic feet)



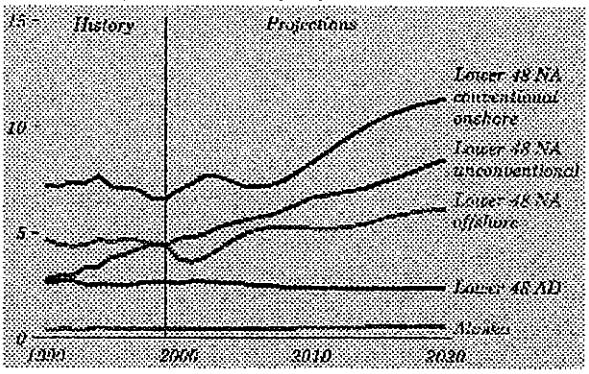
For most of the past two decades lower 48 production of both oil and natural gas has exceeded reserve additions, but the pattern for natural gas reversed from 1994 through 1997. Although reserve additions fell below production in 1998 with the decline in prices, they exceeded production again in 1999. After 2004, rising prices are projected to result in natural gas reserve additions that generally exceed production through 2020 (Figure 92), even with expected increases in demand. The relatively high projected levels of annual gas reserve additions through 2020 reflect an expected increase in exploratory and developmental drilling as a result of higher prices, as well as expected productivity gains from technology improvements comparable to those of recent years. For the most part, total lower 48 crude oil production is projected to continue to exceed total reserve additions (Figure 93), except in the later years in the high world oil price case.

Figure 93. Lower 48 crude oil reserve additions in three cases, 1970-2020 (billion barrels)



Significant New Finds Are Likely To Continue Increases in Gas Production

Figure 94. Natural gas production by source, 1990-2020 (trillion cubic feet)



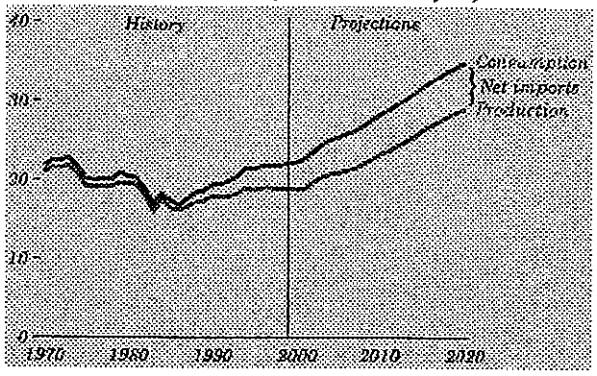
The continuing increase in domestic natural gas production in the forecast is expected to come primarily from lower 48 onshore nonassociated (NA) sources (Figure 94). Conventional onshore production is projected to grow rapidly from 2006 through 2020, increasing in share from 35.5 percent of total U.S. domestic production in 1999 to 39.2 percent of the total in 2020. Gas production from unconventional sources is projected to increase steadily over the forecast as a result of technology advances, playing a key role in meeting projected demand. Offshore production is projected to increase less rapidly but to remain a major source of domestic supply. Innovative use of cost-saving technology in recent years and the expected mid-term continuation of recent huge finds, particularly in the deep waters of the Gulf of Mexico, support the projections.

Natural gas production from Alaska is projected to grow by 1.5 percent per year through 2020, not including gas from the North Slope. The future of North Slope gas is uncertain, however. Current options under consideration include transporting the gas through a pipeline, converting it to liquefied natural gas, and converting it to synthetic petroleum products [*88*].

Production of associated-dissolved (AD) natural gas from lower 48 crude oil reservoirs generally declines in the projections, following the expected pattern of domestic crude oil production. AD gas is projected to account for 8.2 percent of total production in 2020, compared with 14.6 percent in 1999.

Net Imports of Natural Gas Grow in the Projections

Figure 95. Natural gas production, consumption, and imports, 1970-2020 (trillion cubic feet)



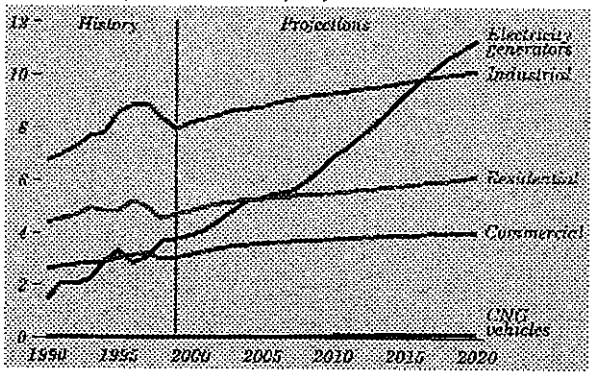
Net natural gas imports are expected to grow in the forecast (Figure 95) from 15.8 percent of total gas consumption in 1999 to 16.7 percent in 2020. Most of the increase is attributable to imports from Canada, which are projected to grow substantially. Most of the additional imports are expected to come from western Canada. In addition, new pipeline capacity is now providing access to eastern supplies. Natural gas from Sable Island, in the offshore Atlantic, began flowing on January 1, 2000.

Mexico has a considerable natural gas resource base, but its indigenous production is unlikely to increase sufficiently to satisfy rising demand. Since 1984, U.S. natural gas trade with Mexico has consisted primarily of exports. That trend is expected to continue throughout the forecast, especially in light of continuing additions to cross-border pipeline capacity. U.S. exports to Mexico are projected to grow from 60 billion cubic feet in 1999 to 520 billion cubic feet in 2020.

Imports of liquefied natural gas (LNG) are projected to increase by 8.0 percent per year on average, resulting in part from the expected reactivation of both the Elba Island terminal in Georgia and the Cove Point terminal in Maryland in 2003. LNG is not expected to grow beyond a regionally significant source of U.S. supply, however. LNG imports are projected to reach a level of 0.81 trillion cubic feet in 2020, compared with 0.16 trillion cubic feet in 1999.

Projected Increases in Natural Gas Use Are Led by Electricity Generators

Figure 96. Natural gas consumption by sector, 1990-2020 (trillion cubic feet)

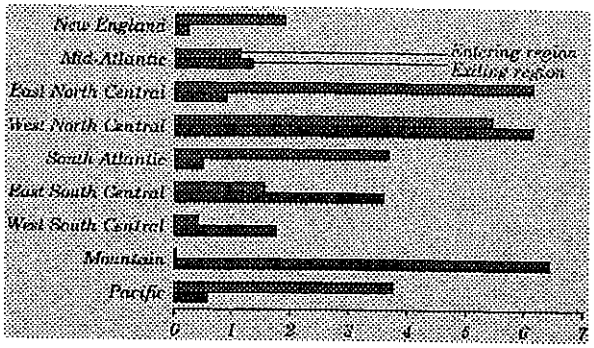


In all the *AEO2001* cases, total natural gas consumption is projected to increase from 1999 to 2020. The projections for domestic consumption in 2020 range from 32.2 trillion cubic feet per year in the low economic growth case to 36.1 trillion cubic feet in the high growth case, as compared with an estimated 21.4 trillion cubic feet in 1999. Although rising demand by electricity generators accounts for 57 percent of the increase in the reference case, growth is also expected in the residential, commercial, industrial, and transportation sectors (Figure 96). Natural gas consumption in the electricity generation sector is projected to grow steadily throughout the forecast as demand for electricity increases and retiring nuclear and older oil and gas steam plants are replaced by gas turbines and combined-cycle facilities.

In the reference case, natural gas consumption for electricity generation (excluding cogeneration) is projected to increase from 3.8 trillion cubic feet in 1999 to 11.3 trillion cubic feet in 2020. In 2017 electricity generation is projected to surpass the industrial sector as the largest consumer of natural gas. Although coal prices to the electricity generation sector are projected to fall throughout the forecast, lower capital costs, shorter construction lead times, higher efficiencies, and lower emissions are expected to give gas-fired generators an advantage over coal-fired plants for new capacity additions in most regions of the United States. Natural-gas-fired facilities are less capital-intensive than coal, nuclear, or renewable electricity generation plants. In addition, the environmental advantages of natural gas are expected to favor increased utilization of existing gas-fired power plants.

Gas Pipeline Capacity Expansion Is Needed To Serve New Markets

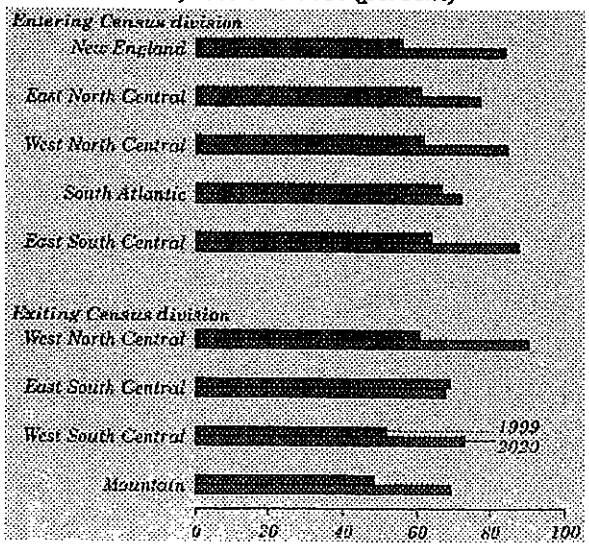
Figure 97. Projected pipeline capacity expansion by Census division, 1999-2020 (billion cubic feet per day)



Projected growth in natural gas consumption will require additional pipeline capacity. Expansion of interstate capacity (Figure 97) will be needed to provide access to new supplies and to serve expanding markets. Expansion is projected to proceed at an average rate of 1.0 percent per year in the forecast.

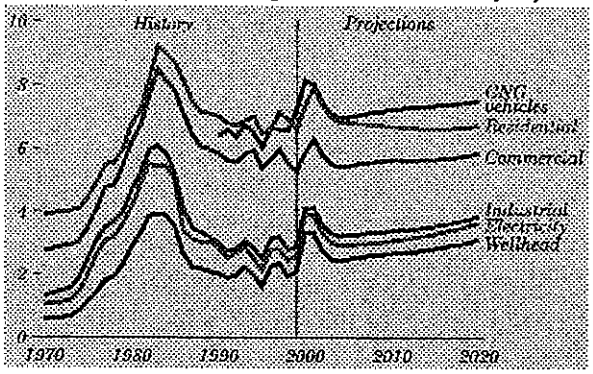
The greatest increases in capacity are expected along the corridors that provide access to Canadian, Gulf Coast, and Mountain region supplies and deliver them to the South Atlantic, Pacific, and Northeast regions. In all regions, growth in new pipeline construction is expected to be tempered by higher utilization of existing pipeline capacity (Figure 98).

Figure 98. Projected pipeline capacity utilization by Census division, 1999 and 2020 (percent)



Competitive Markets Keep Residential Gas Prices in Check

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



Consumer prices for natural gas in all the end-use sectors are projected to be higher in 2020 that they were in 1999 (Figure 99), but prices in the residential and transportation sectors are expected to remain within 5 percent of 1999 levels. The limited price increases in the forecast reflect expectations for declining distribution margins, due in part to anticipated efficiency improvements in an increasingly competitive market. Margins in the industrial sector are projected to remain relatively constant, and growth in end-use prices is expected to result mainly from wellhead price increases. In the electricity generation sector, expected increases in both pipeline margins and wellhead prices combine to yield a projected 1.6-percent average annual increase in end-use prices.

Compared with their rise and decline over the 1970 to 1999 period, transmission and distribution revenues in the natural gas industry are projected to grow relatively steadily from 2000 forward, increasing overall at an average rate of 1.1 percent per year (Table 16). Declines in margins are expected to be balanced by higher volumes.

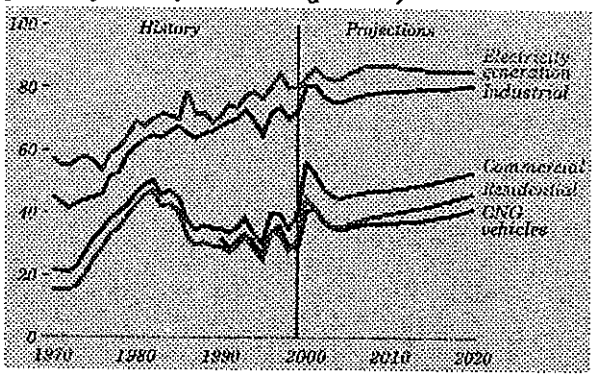
Table 16. Transmission and distribution revenues and margins, 1970-2020

	1970	1985	1999	2010	2015	2020
T&D revenues (billion 1999 dollars)	30.73	49.62	39.86	44.59	47.01	49.82
End-use consumption (trillion cubic feet)	19.21	15.97	21.41	28.05	31.61	34.73
Average margin* (1999 dollars per thousand cubic feet)	1.62	3.14	2.04	1.74	1.63	1.57

*Revenue divided by end-use consumption.

Distribution Costs Claim a Smaller Share of Residential Gas Prices

Figure 100. Wellhead share of natural gas end-use prices by sector, 1970-2020 (percent)



With distribution margins projected to decline, the wellhead shares of end-use prices generally increase in the forecast (Figure 100). The greatest impact is expected in the residential and commercial markets, where most customers purchase gas through local distribution companies (LDCs). In the electricity generation sector, the majority of customers do not purchase from distributors.

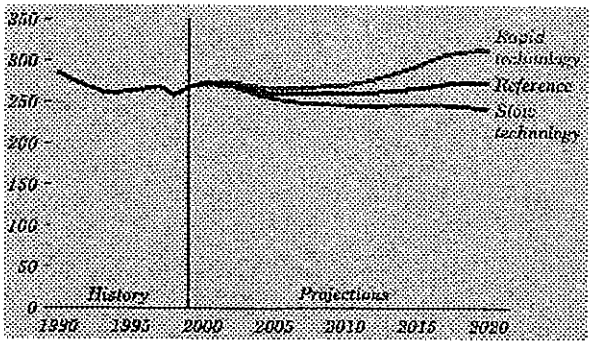
Changes have been seen historically in all components of end-use prices (Table 17). Pipeline margins dropped significantly between 1985 and 1999 with industry restructuring, and the decline is projected to continue through 2010. From 2010 to 2020, pipeline margins are projected to remain relatively flat. LDC margins in the residential and commercial sectors were above 1985 levels in 1999, but efficiency improvements and other impacts of restructuring are expected to exert downward pressure on distribution costs, and lower margins are projected for both the residential and commercial sectors in 2010 and 2020.

Table 17. Components of residential and commercial natural gas end-use prices, 1985-2020 (1999 dollars per thousand cubic feet)

Price Component	1985	1999	2010	2020
Wellhead price	3.38	2.08	2.69	3.13
Citygate price	5.05	3.10	3.60	4.04
Pipeline margin	1.67	1.02	0.91	0.91
LDC margin				
Residential	3.19	3.59	3.10	2.69
Commercial	2.36	2.39	2.05	1.82
End-use price				
Residential	8.24	6.69	6.70	6.73
Commercial	7.41	5.49	5.65	5.86

Technology Advances Could Improve Finding and Drilling Success Rates

Figure 101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 (quadrillion Btu)



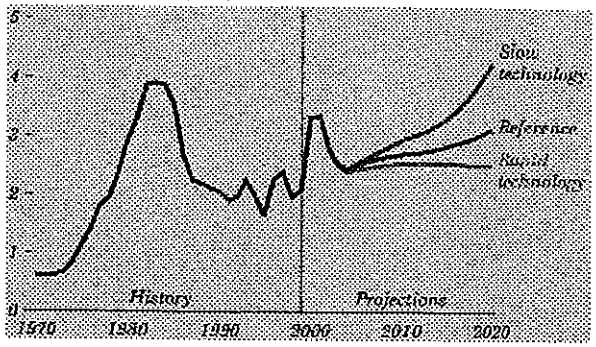
In the forecast, major advances in data acquisition, data processing, and the display and integration of seismic data with other geologic data—combined with lower cost computer power and experience gained with new techniques—are projected to continue putting downward pressure on costs while significantly improving finding and success rates. Effective use of improved exploration and production technologies to aid in the discovery and development of resources—particularly, unconventional gas and offshore deepwater fields—will be needed if new reserves are to replace those depleted by production.

Alternative cases assess the sensitivity of the projections to changes in success rates, exploration and development costs, and finding rates as a result of technological progress. The assumed technology improvement rates increase and decrease by 25 percent in the rapid and slow technology cases, which are analyzed as fully integrated model runs. All other parameters in the model are at their reference case values, including technology parameters in other energy markets, parameters affecting foreign oil supply, and assumptions about foreign natural gas trade, excluding Canada.

Although gas reserves are projected to make up a slightly larger share of the total in the reference case, total hydrocarbon reserve additions are expected to offset production, keeping total reserves essentially constant throughout the forecast (Figure 101). By 2020, reserves are projected to be 14.4 percent higher in the rapid technology case than in the reference case and 11.3 percent lower in the slow technology case.

Gas Price Projections Change With Technology Assumptions

Figure 102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 (1999 dollars per thousand cubic feet)



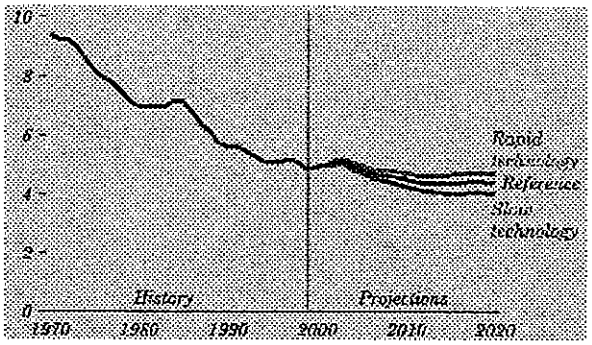
The natural gas price projections are highly sensitive to changes in assumptions about technological progress (Figure 102). Lower 48 wellhead prices are projected to increase at an average annual rate of 3.4 percent in the slow technology case, compared with only 2.0 percent in the reference case, over the projection period. In the rapid technology case, average natural gas wellhead prices are projected to remain relatively flat through 2020 at about $2.50 per thousand cubic feet.

Through 2003, the projections of both price and production levels for lower 48 oil and natural gas are almost identical in the reference case and the two technological progress cases. By 2020, however, natural gas prices are projected to be 35.1 percent higher (at $4.23 per thousand cubic feet) in the slow technology case and 20.1 percent lower (at $2.50 per thousand cubic feet) in the rapid technology case than the reference case level of $3.13 per thousand cubic feet.

Unlike the projections for natural gas prices, those for lower 48 average wellhead prices for crude oil do not vary significantly across the technology cases. In both the rapid and slow technology cases, the projections for crude oil prices vary from the reference case projections by at most $0.14 per barrel. Domestic oil prices are determined largely by the international market; changes in U.S. oil production do not constitute a significant volume relative to the global market.

More Rapid Technology Advances Could Raise Oil Production Slightly

Figure 103. Lower 48 crude oil production in three technology cases, 1970-2020 (million barrels per day)



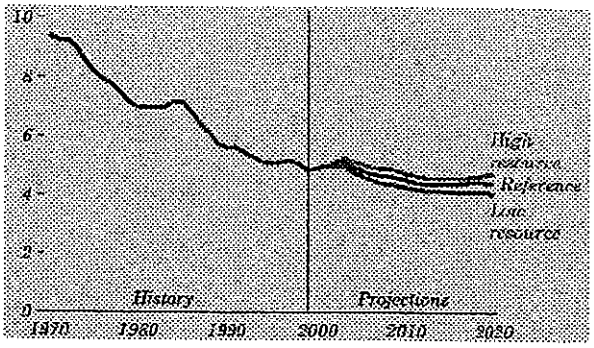
Projections for domestic oil production also are sensitive to changes in technological progress assumptions (Figure 103). In comparison with the projected lower 48 production level of 4.4 million barrels per day in 2020 in the reference case, oil production is projected to increase to 4.7 million barrels per day in the rapid technology case and to decrease to 4.0 million barrels per day in the slow technology case.

Given the assumption that changes in the levels of technology affect only U.S. oil producers, total oil supply adjusts to the variations in technological progress assumptions primarily through changes in imports of crude oil and other petroleum products. Net imports in 2020 are projected to range from a low of 16.1 million barrels per day in the rapid technology case to a high of 17.4 million barrels per day in the slow technology case.

Offshore oil production in the lower 48 States shows more sensitivity than onshore production to changes in technological progress assumptions, because large deepwater fields that are not economically feasible in the slow technology case are projected to become profitable in the rapid technology case. Cumulative offshore production from 1999 through 2020 is projected to be about 745 million barrels (4.9 percent) higher in the rapid technology case than in the reference case and 922 million barrels (6.0 percent) lower in the slow technology case than in the reference case. For onshore production, in contrast, the projected differences are only 3.5 percent and 3.6 percent. The projections for Alaskan oil production vary by about 3.9 percent from the reference case in both the rapid and slow technology cases.

Oil Production Forecasts Vary, Depending on Resource Estimates

Figure 104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 (million barrels per day)



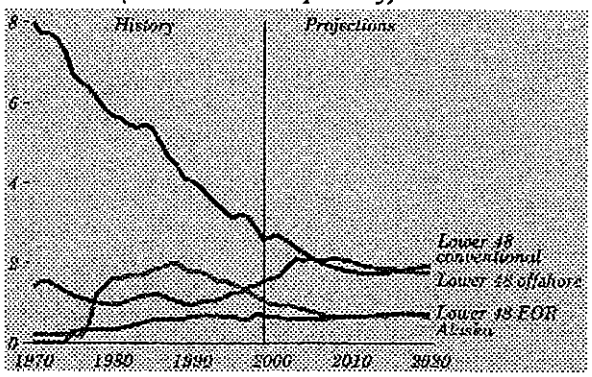
Another important assumption for the projections of domestic oil and gas resources is the size of the domestic resource base. Two alternative cases were used to evaluate the impacts of uncertainty in the resource estimates. In the high and low resource sensitivity cases, the estimates for both undiscovered technically recoverable resources and inferred reserves for conventional onshore and offshore production were increased and decreased, respectively, by 20 percent. As in the other *AEO2001* cases, resources in areas currently restricted from exploration and development were excluded from the resource assumption.

In the high resource case, both oil production levels and industry profits are projected to increase over those projected in the reference case. Lower 48 crude oil production is projected to reach 4.8 million barrels per day in 2020, as compared with 4.4 million barrels per day projected in the reference case (Figure 104). The corresponding projection in the low resource case is 4.0 million barrels per day.

The variations in oil production projections in the two resource sensitivity cases lead to similar variations in the projections of oil import dependence. In the high resource case, with higher projected production levels, net petroleum imports are projected to make up 62 percent of domestic supply in 2020, compared with 64 percent in the reference case. In the low resource case, with lower projected domestic production, imports are projected to make up 68 percent of domestic supply.

Domestic Crude Oil Production Continues To Decline

Figure 105. Crude oil production by source, 1970-2020 (million barrels per day)

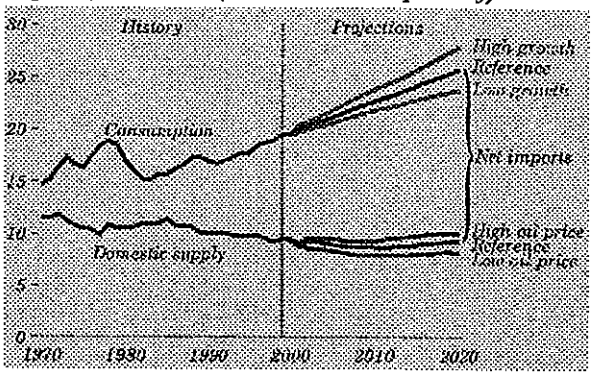


Domestic crude oil production is projected to remain relatively stable from 1999 through 2003 as a result of a favorable price environment and increased success of offshore drilling (Figure 105). A decline in production is projected from 2004 through 2010, followed by another period of projected stable production levels through 2020 as a result of rising prices and continuing improvements in technology [*89*]. In 2020, the projected domestic production level of 5.1 million barrels per day is 0.8 million barrels per day less than the 1999 level.

Conventional onshore production in the lower 48 States, accounting for 44 percent of total U.S. crude oil production in 1999, is projected to decrease to 38 percent in 2020, with production from mature areas expected to decline. Offshore production is projected to range from 1.6 to 2.1 million barrels per day throughout the forecast, surpassing the projected level of lower 48 conventional onshore production from 2006 to 2016. Crude oil production from Alaska is expected to decline at an average annual rate of 2.4 percent between 1999 and 2020. Projected drops in production from most of Alaska's oil fields—particularly Prudhoe Bay, the State's largest producing field—are expected to be offset by production from the National Petroleum Reserve–Alaska (NPRA), which is projected to commence in 2010. Production from the Alaska National Wildlife Refuge (ANWR) is not included, because drilling in the area is currently prohibited. Production from enhanced oil recovery (EOR) [*90*] is expected to slow as it becomes less profitable when oil prices fall in the forecast through 2003, and then to increase along with the world oil price projections until close to the end of the forecast.

Imports Fill the Gap Between Domestic Supply and Demand

Figure 106. Petroleum supply, consumption, and imports, 1970-2020 (million barrels per day)



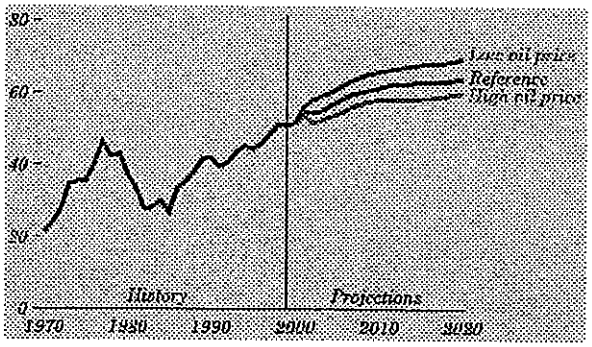
In the reference case, domestic petroleum supply is projected to decline slightly from its 1999 level of 9.5 million barrels per day to 9.3 million barrels per day in 2020 (Figure 106). As U.S. crude oil production falls off, refinery gain and production of natural gas plant liquids are projected to increase. Domestic supply in 2020 is projected to drop to 8.2 million barrels per day in the low oil price case and to rise to 10.1 million barrels per day in the high oil price case.

The greatest variation in petroleum consumption levels is seen across the economic growth cases, with a projected increase of 8.5 million barrels per day over the 1999 level in the high growth case, compared with a projected increase of only 4.4 million barrels per day in the low growth case.

Additional petroleum imports would be needed to fill the projected widening gap between supply and consumption. The greatest gap between supply and consumption is projected in the low world oil price case and the smallest in the low economic growth case. The projections for net petroleum imports in 2020 range from a high of 18.8 million barrels per day in the low oil price case to a low of 15.0 million barrels per day in the low growth case, compared with the 1999 level of 10.0 million barrels per day. The expected value of petroleum imports in 2020 ranges from $115.8 billion in the low price case to $170.8 billion in the high economic growth case. Total annual U.S. expenditures for petroleum imports, which reached a historical peak of $138.9 billion (in 1999 dollars) in 1980 [*91*], were $60.2 billion in 1999.

Growing Dependence on Petroleum Imports Is Projected

Figure 107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 (percent)



In 1999, net imports of petroleum accounted for 51 percent of domestic petroleum consumption. Continued dependence on petroleum imports is projected, reaching 64 percent in 2020 in the reference case (Figure 107). The corresponding import shares of total consumption in 2020 are projected to be 60 percent in the high oil price case and 70 percent in the low price case.

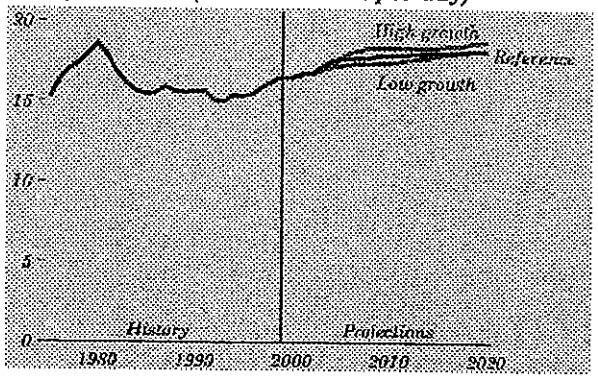
Although crude oil is expected to continue as the major component of petroleum imports, refined products are projected to represent a growing share. More imports would be needed as the projected growth in demand for refined products exceeds the expansion of domestic refining capacity. Refined products are projected to make up 19 percent of net petroleum imports in 2020 in the low economic growth case and 32 percent in the high growth case, as compared with their 13-percent share in 1999 (Table 18).

Table 18. Petroleum consumption and net imports in five cases, 1999 and 2020 (million barrels per day)

Year and projection	Product supplied	Net imports	Net crude imports	Net product imports
1999	19.5	9.9	8.6	1.3
2020				
Reference	25.8	16.5	12.1	4.4
Low oil price	27.0	18.8	13.3	5.5
High oil price	25.3	15.2	11.5	3.7
Low growth	23.9	15.0	12.1	2.9
High growth	28.0	18.2	12.5	5.8

New U.S. Oil Refining Capacity Is Likely To Be at Existing Refineries

Figure 108. Domestic refining capacity in three cases, 1975-2020 (million barrels per day)



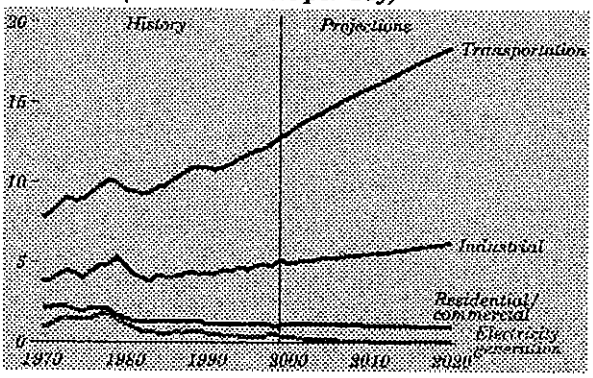
Falling demand for petroleum and the deregulation of the domestic refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity. That trend was reversed in 1995, and 1.2 million barrels per day of distillation capacity had been added by 2000. Financial and legal considerations make it unlikely that new refineries will be built in the United States, but additions at existing refineries are expected to increase total U.S. refining capacity in all the *AEO2001* cases (Figure 108).

Distillation capacity is projected to grow from the 1999 year-end level of 16.5 million barrels per day to 18.2 million in 2020 in the low economic growth case and 18.8 million in the high growth case, compared with the 1981 peak of 18.6 million barrels per day. Almost all the capacity additions are projected to occur on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively throughout the forecast, in a range from 91 percent to 95 percent of design capacity. In comparison, the 1999 utilization rate was 93 percent, well above the rates of the 1980s and early 1990s.

Additional "downstream" processing units are expected to allow domestic refineries to produce less residual fuel, which has a shrinking market, and more higher value "light product" such as gasoline, distillate, jet fuel, and liquefied petroleum gases.

Petroleum Use Increases Mainly in the Transportation Sector

Figure 109. Petroleum consumption by sector, 1970-2020 (million barrels per day)



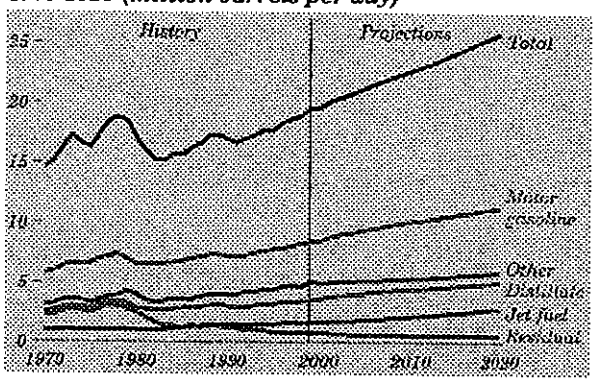
U.S. petroleum consumption is projected to increase by 6.3 million barrels per day between 1999 and 2020. Most of the increase is expected in the transportation sector, which accounted for two-thirds of U.S. petroleum use in 1999 (Figure 109). Petroleum use for transportation is projected to increase by 5.6 million barrels per day in the reference case, 4.3 million in the low economic growth case, and 7.0 million in the high economic growth case.

In the industrial sector, which currently accounts for 26 percent of U.S. petroleum use, consumption in 2020 is projected to be higher than the 1999 level by 1.1 million barrels per day in the reference case, by 0.4 million in the low economic growth case, and by 1.9 million in the high economic growth case. About 84 percent of the growth is expected in the petrochemical, construction, and refining sectors.

In the reference case, petroleum use for heating and for electricity generation is expected to decline as oil loses market share to natural gas. Increased oil use for heating and electricity generation is projected, however, in the low oil price case. Natural gas use for home heating is growing in New England, the last stronghold of heating oil. Compared with 1999, heating oil use is projected to be 150,000 barrels per day lower in 2020 in the high price case and 90,000 barrels per day higher in the low price case. For electricity generation, oil-fired steam plants are being retired in favor of natural gas combined-cycle units. Oil use for electricity generation (excluding cogeneration) is projected to be 320,000 barrels per day lower in 2020 than in 1999 in the high price case and 110,000 barrels per day higher in the low price case.

Light Products Account for Most of the Increase in Demand for Petroleum

Figure 110. Consumption of petroleum products, 1970-2020 (million barrels per day)

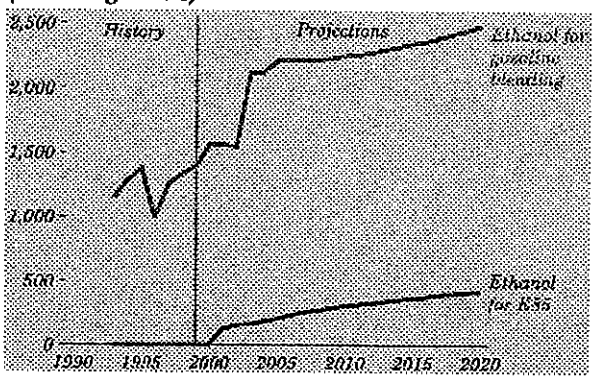


About 96 percent of the projected growth in petroleum consumption stems from increased consumption of "light products," including gasoline, diesel, heating oil, jet fuel, and liquefied petroleum gases, which are more difficult and costly to produce than heavy products (Figure 110). Although refinery investments and enhancements are expected to increase the ability of domestic refineries to produce light products, imports of light products are expected to more than triple by 2020.

In the forecast, gasoline continues to account for almost 45 percent of all the petroleum used in the United States. Between 1999 and 2020, U.S. gasoline consumption is projected to rise from 8.4 million barrels per day to 11.3 million barrels per day. Consumption of distillate fuel is projected to be 1.6 million barrels per day higher in 2020 than it was in 1999, with diesel fuel accounting for 92 percent of the projected increase as demand for freight transportation grows. With air travel also expected to increase, jet fuel consumption is projected to be 1.2 million barrels per day higher in 2020 than in 1999. Consumption of liquefied petroleum gas (LPG), included in "other" petroleum, is projected to increase by about 360,000 barrels per day between 1999 and 2020. Consumption of "other" petroleum products—including petrochemical feedstocks, still gas used to fuel refineries, asphalt and road oil, and other miscellaneous products—is projected to grow by 490,000 barrels per day. Residual fuel use, mainly for electricity generation, is projected to decline from 820,000 barrels per day in 1999 to 600,000 barrels per day in 2020.

State Bans on MTBE Are Expected To Result in Increased Use of Ethanol

Figure 111. U.S. ethanol consumption, 1993-2020 (million gallons)



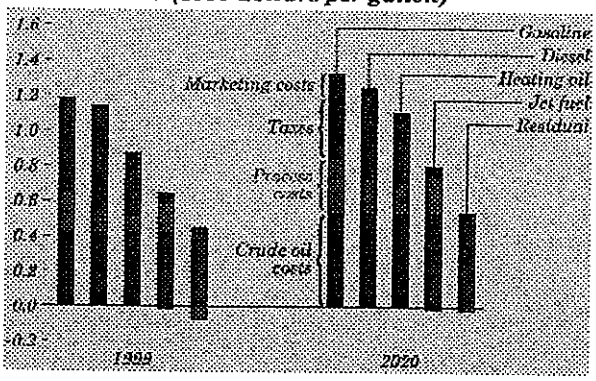
U.S. ethanol production, with corn as the primary feedstock, reached 1.5 billion gallons in 1999. Production is projected to increase to 2.9 billion gallons by 2020, with most of the growth coming from the conversion of cellulosic biomass to ethanol. Ethanol is used primarily in the Midwest as a gasoline volume extender and octane enhancer in a blend of 10 percent ethanol and 90 percent gasoline. It also serves as an oxygenate in areas that are required to use oxygenated fuels (with a minimum 2.7 percent oxygen content by volume) during the winter months to reduce carbon monoxide emissions.

AEO2001 projects an expanded role for ethanol, replacing MTBE as the oxygenate for reformulated gasoline (RFG) in the eight States that have passed legislation limiting the use of MTBE because of concerns about groundwater contamination. The reference case assumes that the Federal requirement for a 2-percent oxygen content in RFG will continue in all States. Ethanol consumption in E85 vehicles is also projected to increase, from the national total of 2.0 million gallons in 1999 to 421 million gallons in 2020 (Figure 111). E85 vehicles are currently in use as government fleet vehicles, flexible-fuel passenger vehicles (which run on either E85 or gasoline), and urban transit buses.

The Federal Highway Bill of 1998 extended the current excise tax exemption for ethanol through 2007 but stipulated reductions from 54 cents per gallon to 53 cents in 2001, 52 cents in 2003, and 51 cents in 2005. *AEO2001* assumes that the exemption will be extended at 51 cents per gallon (nominal) through 2020.

Processing Costs for Most Petroleum Products Rise in the Forecast

Figure 112. Components of refined product costs, 1999 and 2020 (1999 dollars per gallon)

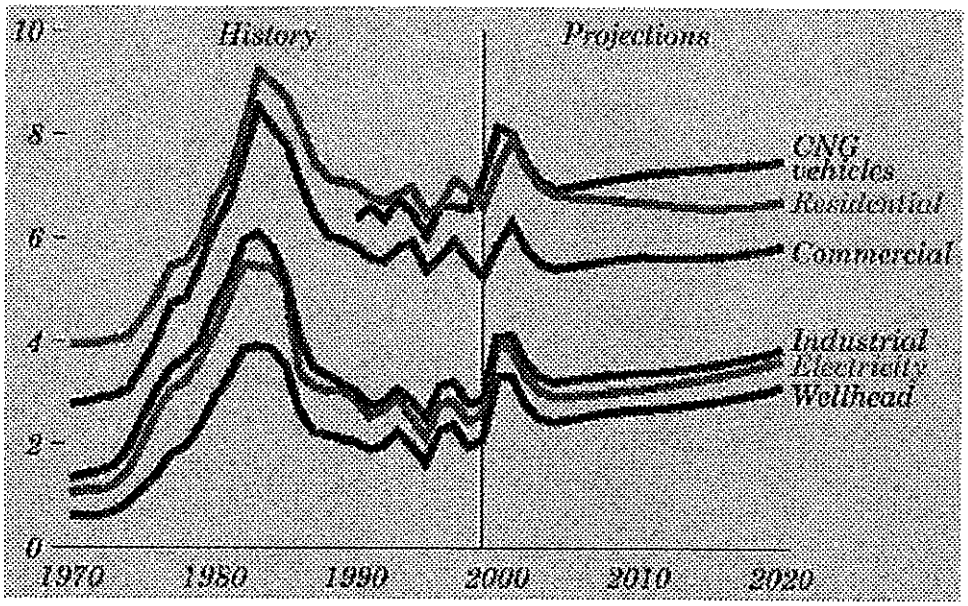


Refined product prices are determined by crude oil costs, refining process costs (including refiner profits), marketing costs, and taxes (Figure 112). In the *AEO2001* projections, crude oil costs are projected to continue making the greatest contribution to product prices and marketing costs are projected to remain stable, but the contributions of processing costs and taxes are expected to change considerably.

The processing costs for light products, including gasoline, diesel fuel, heating oil, and jet fuel, are projected to increase by 6 to 7 cents per gallon between 1999 and 2020. The expected increases are attributed primarily to the projected growth in demand for those products, investment needed to meet new Federal requirements for low-sulfur gasoline between 2004 and 2007, and investments related to compliance with refinery emissions, health, and safety regulations.

Whereas processing costs tend to increase refined product prices in the forecast, assumptions about Federal taxes tend to slow the growth of motor fuels prices. In keeping with the *AEO2001* assumption of current laws and legislation, Federal motor fuels taxes are assumed to remain at nominal 1999 levels throughout the forecast, although Federal taxes have actually been raised sporadically in the past. State motor fuels taxes are assumed to keep up with inflation, as they have in the past. The net impact of the assumptions is an expected decrease in Federal taxes (in 1999 dollars) between 1999 and 2020—7 cents per gallon for gasoline, 9 cents for diesel fuel, and 1 cent for jet fuel.

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



History: Energy Information Administration, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). **Projections:** Table A14.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts				
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AGA	NPC
2015								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	2.83	2.59	3.20	2.64	1.89	2.79	2.56	3.67
Dry gas production[b]	26.24	24.63	27.86	24.43	28.58	24.00	26.71	26.50
Net imports	5.50	5.35	5.62	5.35	4.01	5.70	4.15	4.70
Consumption	31.61	29.85	33.36	30.18	32.78	29.46	30.86	31.84
Residential	5.88	5.70	5.90	5.67	5.67	5.57	5.93	6.07
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3.95	4.09
Industrial[e]	9.76	9.18	10.50	6.83[d]	10.98	8.43[e]	10.72	10.76
Electricity generators[f]	9.80	8.54	9.97	11.63[e]	8.72	9.25[e]	7.06	7.76
Other[h]	2.78	2.63	2.92	2.57	3.27	2.75	3.20	3.16[i]
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6.31[j]	7.65
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.08	5.07[j]	6.76
Industrial[e]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.09[j,l]	4.86[k]
Electricity generators[f]	3.30	3.05	3.67	3.12[e]	2.55	3.24	2.99[l]	4.21
2020								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	3.13	2.66	3.68	2.72	NA	3.07	NA	NA
Dry gas production[b]	29.04	26.74	30.38	25.72	NA	25.13	NA	NA
Net imports	5.30	5.58	5.82	5.72	NA	6.00	NA	NA
Consumption	34.73	32.22	36.09	31.32	NA	28.58	NA	NA
Residential	6.14	5.95	6.21	5.88	NA	5.84	NA	NA
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	NA	NA
Industrial[e]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	NA	NA
Electricity generators[f]	11.34	10.28	11.29	12.72[e]	NA	9.83[e]	NA	NA
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	NA	NA
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.73	6.32	7.24	7.44	NA	7.25	NA	NA
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	NA	NA
Industrial[e]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	NA	NA
Electricity generators[f]	3.66	3.17	4.17	3.20[e]	NA	3.52	NA	NA

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore, forecast values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,029 Btu per cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: *AEO2001*: AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case), LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). WEFA: The WEFA Group, *Natural Gas Outlook* (2000). GRI: Gas Research Institute, *GRI Baseline Projection of U.S. Energy Supply and Demand*, 2000 Edition (January 2000). DRI: Standard & Poor's DRI, *U.S. Energy Outlook* (Spring/Summer 2000). AGA: American Gas Association, *1999 AGA-TERA Base Case* (December 1999). NPC: National Petroleum Council, *Natural Gas, Meeting the Challenges of the Nation's Growing Natural Gas Demand* (December 1999).

Table A3. Energy Prices by Sector and Source
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Residential	13.84	13.17	12.93	13.16	13.33	13.59	0.1%
Primary Energy[1]	6.87	6.72	7.12	7.01	6.92	7.01	0.2%
Petroleum Products[2]	7.53	7.56	8.18	8.37	8.49	8.64	1.2%
Distillate Fuel	6.25	6.27	7.33	7.51	7.80	7.98	1.2%
Liquefied Petroleum Gas	10.45	10.36	12.83	13.07	12.83	12.87	1.0%
Natural Gas	6.74	6.52	6.63	6.53	6.44	6.65	0.0%
Electricity	24.24	23.60	21.90	21.88	22.01	22.17	-0.3%
Commercial	13.53	13.25	12.39	11.75	11.96	12.37	-0.3%
Primary Energy[1]	5.26	5.22	5.35	5.53	5.55	5.74	0.5%
Petroleum Products[2]	4.66	5.00	6.01	6.17	6.34	6.50	1.3%
Distillate Fuel	4.01	4.37	5.12	5.28	5.65	5.75	1.3%
Residual Fuel	2.42	2.63	3.84	3.69	3.77	3.85	1.8%
Natural Gas[3]	5.47	5.34	5.31	5.50	5.60	5.71	0.3%
Electricity	22.17	21.54	19.58	17.63	17.72	18.12	-0.8%
Industrial[4]	4.97	5.33	5.49	5.45	5.56	5.85	0.4%
Primary Energy	3.51	3.92	4.25	4.38	4.48	4.72	0.9%
Petroleum Products[2]	4.79	5.65	5.95	6.05	6.10	6.27	0.6%
Distillate Fuel	4.11	4.85	5.29	5.45	5.73	5.94	1.2%
Liquefied Petroleum Gas	7.27	8.50	7.94	8.01	7.75	7.83	-0.4%
Residual Fuel	2.56	2.78	3.36	3.42	3.50	3.58	1.2%
Natural Gas[5]	2.73	2.79	3.17	3.31	3.45	3.76	1.4%
Metallurgical Coal	1.73	1.65	1.59	1.54	1.49	1.44	-0.7%
Steam Coal	1.45	1.43	1.35	1.29	1.25	1.21	-0.8%
Electricity	13.34	13.09	12.34	11.24	11.27	11.62	-0.6%
Transportation	7.79	8.30	9.27	9.46	9.38	9.31	0.5%
Primary Energy	7.68	8.29	9.25	9.45	9.36	9.29	0.5%
Petroleum Products[2]	7.68	8.28	9.25	9.44	9.36	9.29	0.5%
Distillate Fuel[6]	7.66	8.22	8.89	8.94	9.05	8.98	0.4%
Jet Fuel[7]	4.13	4.70	5.25	5.47	5.75	5.88	1.1%
Motor Gasoline[8]	8.74	9.45	10.64	10.93	10.75	10.68	0.8%
Residual Fuel	2.29	2.46	3.10	3.18	3.25	3.33	1.5%
Liquefied Petroleum Gas[9]	11.23	12.87	14.19	14.28	13.98	13.84	0.3%
Natural Gas[10]	6.40	7.02	6.80	7.04	7.17	7.32	0.2%
Ethanol (E85)[11]	14.25	14.42	19.12	19.00	19.24	19.36	1.4%
Methanol (M85)[12]	8.93	10.38	13.12	13.74	14.33	14.43	1.6%
Electricity	15.86	15.57	14.33	13.47	13.21	13.06	-0.8%
Average End-Use Energy	8.26	8.55	8.91	8.95	9.01	9.17	0.3%
Primary Energy	5.89	6.33	7.00	7.16	7.21	7.30	0.7%
Electricity	20.03	19.50	18.15	17.20	17.30	17.59	-0.5%
Electric Generators[13]							
Fossil Fuel Average	1.50	1.49	1.52	1.54	1.68	1.86	1.1%
Petroleum Products	2.32	2.50	3.70	4.11	4.27	4.35	2.7%
Distillate Fuel	3.25	4.06	4.65	4.84	5.10	5.28	1.3%
Residual Fuel	2.22	2.42	3.52	3.88	4.00	4.07	2.5%
Natural Gas	2.41	2.55	2.88	3.03	3.24	3.50	1.6%
Steam Coal	1.27	1.21	1.13	1.05	1.01	0.98	-1.0%

Table A8. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Generation by Fuel Type							
Electric Generators[1]							
Coal	1826	1833	2065	2196	2246	2298	1.1%
Petroleum	115	100	32	17	17	19	-7.7%
Natural Gas[2]	346	371	564	900	1286	1567	7.2%
Nuclear Power	674	730	740	720	639	574	-1.1%
Pumped Storage	-2	-1	-1	-1	-1	-1	N/A
Renewable Sources[3]	359	353	370	390	395	396	0.5%
Total	3317	3386	3810	4222	4583	4872	1.7%
Nonutility Generation for Own Use	16	16	17	16	16	16	-0.0%
Distributed Generation	0	0	1	3	4	6	N/A
Cogenerators[4]							
Coal	52	47	52	52	52	52	0.5%
Petroleum	15	9	10	10	10	10	0.4%
Natural Gas	197	206	239	257	276	299	1.8%
Other Gaseous Fuels[5]	8	4	6	7	7	8	3.3%
Renewable Sources[3]	31	31	34	39	44	48	2.0%
Other[6]	8	5	5	5	5	5	0.3%
Total	310	302	347	370	394	422	1.6%
Other End-Use Generators[7]	6	5	5	5	5	5	0.6%
Sales to Utilities	158	151	171	176	187	200	1.4%
Generation for Own Use	168	156	181	199	213	227	1.8%
Net Imports[8]	27	32	52	29	21	21	-2.0%
Electricity Sales by Sector							
Residential	1128	1146	1316	1455	1573	1701	1.9%
Commercial	1088	1083	1274	1432	1559	1643	2.0%
Industrial	1040	1063	1144	1228	1309	1411	1.4%
Transportation	17	17	26	35	43	49	5.0%
Total	3253	3309	3761	4147	4484	4804	1.8%
End-Use Prices (1999 cents per kilowatthour)[9]							
Residential	8.3	8.1	7.5	7.5	7.5	7.6	-0.3%
Commercial	7.6	7.3	6.7	6.0	6.0	6.2	-0.8%
Industrial	4.6	4.5	4.2	3.8	3.8	4.0	-0.6%
Transportation	5.4	5.3	4.9	4.6	4.6	4.5	-0.8%
All Sectors Average	6.8	6.7	6.2	5.9	5.9	6.0	-0.5%
Prices by Service Category (1999 cents per kilowatthour)[9]							
Generation	4.3	4.1	3.6	3.2	3.2	3.4	-0.9%
Transmission	0.6	0.6	0.6	0.7	0.7	0.7	0.7%
Distribution	2.0	2.0	2.0	2.0	2.0	2.0	-0.0%
Emissions (million short tons)							
Sulfur Dioxide	13.13	12.46	10.30	9.28	9.33	8.95	-1.6%
Nitrogen Oxide	5.83	5.45	4.25	4.22	4.33	4.42	-1.0%

[1]Includes grid-connected generation at all utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.
[2]Includes electricity generation by fuel cells.
[3]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[4]Cogenerators produce electricity and other useful thermal energy. Includes sales to utilities and generation for own use.
[5]Other gaseous fuels include refinery and still gas.
[6]Other includes hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.
[7]Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.
[8]In 1998 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.
[9]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1998: Electric generators and cogenerators generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Electric Power Annual 1998, Volume 2*, DOE/EIA-0348(98)/2 (Washington, DC, December 1999), and supporting databases. Other generators: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility" and Department of Energy, Office of Energy Efficiency and Renewable Energy estimates. Commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 19* (Oak Ridge, TN, 1999 September 1999). Prices: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A. 1999 and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A.

Reference Case Forecast

Table A14. Natural Gas Prices, Margins, and Revenues
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Source Price							
Average Lower 48 Wellhead Price[1]	2.02	2.08	2.49	2.69	2.83	3.13	2.0%
Average Import Price	1.99	2.29	2.49	2.43	2.47	2.67	0.7%
Average[2]	2.01	2.11	2.49	2.64	2.76	3.05	1.8%
Delivered Prices							
Residential	6.92	6.69	6.81	6.70	6.61	6.73	0.0%
Commercial	5.62	5.49	5.45	5.65	5.65	5.86	0.3%
Industrial[3]	2.80	2.87	3.26	3.40	3.54	3.86	1.4%
Electric Generators[4]	2.48	2.59	2.94	3.08	3.30	3.66	1.6%
Transportation[5]	6.57	7.21	6.89	7.23	7.36	7.52	0.2%
Average[6]	4.13	4.16	4.35	4.38	4.39	4.62	0.5%
Transmission and Distribution Margins[7]							
Residential	4.91	4.58	4.32	4.07	3.85	3.68	-1.0%
Commercial	3.60	3.37	2.96	3.01	2.89	2.81	-0.9%
Industrial[3]	0.79	0.75	0.77	0.76	0.78	0.82	0.4%
Electric Generators[4]	0.44	0.48	0.44	0.45	0.54	0.61	1.2%
Transportation[5]	4.56	5.10	4.50	4.60	4.60	4.48	-0.6%
Average[6]	2.12	2.04	1.88	1.74	1.63	1.57	-1.2%
Transmission and Distribution Revenue (billion 1999 dollars)							
Residential	22.31	21.61	22.96	22.55	22.42	22.58	0.2%
Commercial	10.87	10.36	10.71	11.40	11.38	11.31	0.4%
Industrial[3]	6.60	6.00	6.75	7.12	7.61	8.32	1.6%
Electric Generators[4]	1.63	1.81	2.38	3.11	5.02	6.93	6.6%
Transportation[5]	0.05	0.08	0.25	0.42	0.58	0.68	11.0%
Total	41.45	39.86	43.04	44.59	47.61	49.82	1.1%

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1998 residential, commercial, and transportation delivered prices; average lower 48 wellhead price; and average import price: Energy Information Administration (EIA), *Natural Gas Annual 1998*, DOE/EIA-0131(98) (Washington, DC, October 1999). 1998 electric generators delivered price: Form FERC-423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 1998 and 1999 industrial delivered prices based on EIA, *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1998 values, other 1999 values, and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101500A.

Table B14. Natural Gas Prices, Margins, and Revenue
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	1999	Projections								
		2010			2015			2020		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Source Price										
Average Lower 48 Wellhead Price[1]	2.08	2.49	2.69	3.06	2.59	2.83	3.20	2.66	3.13	3.68
Average Import Price	2.29	2.33	2.43	2.53	2.35	2.47	2.58	2.44	2.67	2.89
Average[2]	2.11	2.46	2.64	2.98	2.54	2.76	3.09	2.62	3.05	3.55
Delivered Prices										
Residential	6.69	6.50	6.70	7.09	6.37	6.61	6.95	6.32	6.73	7.24
Commercial	5.49	5.45	5.65	6.03	5.41	5.65	6.00	5.42	5.86	6.38
Industrial[3]	2.87	3.20	3.40	3.78	3.29	3.54	3.91	3.38	3.86	4.43
Electric Generators[4]	2.59	2.90	3.08	3.45	3.05	3.30	3.67	3.17	3.66	4.17
Transportation[5]	7.21	6.95	7.23	7.74	6.99	7.36	7.84	6.96	7.52	8.17
Average[6]	4.16	4.21	4.38	4.72	4.17	4.39	4.72	4.19	4.62	5.14
Transmission & Distribution Margins[7]										
Residential	4.58	4.05	4.07	4.12	3.83	3.85	3.86	3.70	3.68	3.69
Commercial	3.37	2.99	3.01	3.05	2.88	2.89	2.91	2.80	2.81	2.84
Industrial[3]	0.75	0.74	0.76	0.80	0.74	0.78	0.82	0.76	0.82	0.88
Electric Generators[4]	0.46	0.44	0.45	0.47	0.50	0.54	0.59	0.55	0.61	0.62
Transportation[5]	5.10	4.49	4.60	4.76	4.45	4.60	4.75	4.34	4.48	4.62
Average[6]	2.04	1.75	1.74	1.74	1.63	1.63	1.63	1.57	1.57	1.60
Transmission & Distribution Revenue (billion 1999 dollars)										
Residential	21.61	22.21	22.55	22.88	21.83	22.42	22.78	22.03	22.58	22.93
Commercial	10.36	11.05	11.40	11.72	10.85	11.38	11.84	10.73	11.31	11.88
Industrial[3]	5.00	6.66	7.12	7.88	6.80	7.61	8.86	7.08	8.32	9.86
Electric Generators[4]	1.81	2.87	3.11	3.48	4.29	5.02	5.84	5.67	6.93	7.05
Transportation[5]	0.06	0.39	0.42	0.45	0.53	0.58	0.63	0.62	0.69	0.77
Total	39.86	43.18	44.59	46.40	44.31	47.01	49.76	46.13	49.82	52.48

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.
Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1999 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1999 values and projections: EIA, AEO2001 National Energy Modeling System runs LM2001.D101600A, AEO2001.D101600A, and HM2001.D101600A.

Report Contents

[Report# DOE/EIA-0383(2001)]
December 22, 2000
(Next Release: December, 2001)

Preface

Overview

Legislation & Regulations

Issues in Focus

Market Trends

Forecast Comparisons

Major Assumptions for the Forecasts

Summary of the AEO2001 Cases/ Scenarios
- Appendix Table G1

Model Results (Formats - PDF, ZIP)
- Appendix Tables
- Reference Case
- 1998 to 2020

Download

Forecast Comparisons

Economic Growth	World Oil Prices	Total Energy Consumption	Residential and Commercial Sectors	Industrial Sector
Transportation Sector	Electricity	Natural Gas	Petroleum	Coal

Three other organizations—Standard & Poor's DRI (DRI), the WEFA Group (WEFA), and the Gas Research Institute (GRI) [95]—also produce comprehensive energy projections with a time horizon similar to that of *AEO2001*. The most recent projections from those organizations (DRI, Spring/Summer 2000; WEFA, 1st Quarter 2000; GRI, January 2000), as well as other forecasts that concentrate on petroleum, natural gas, and international oil markets, are compared here with the *AEO2001* projections.

Economic Growth

Differences in long-run economic forecasts can be traced primarily to different views of the major supply-side determinants of growth in gross domestic product (GDP): labor force and productivity change (Table 19). In comparison with the *AEO2001* and DRI reference cases, the WEFA forecast shows the highest economic growth, including a higher growth rate for the labor force. The *AEO2001* long-run forecast of average annual economic growth from 1999 to 2020 in the reference case is 3.0 percent—0.9 percent higher than the *AEO2000* forecast.

Table 19. Forecasts of economic growth, 1999-2020

The June 26, 2000, mid-session review by the Office of Management and Budget projected real GDP growth of 3.1 percent per year between 1999 and 2010. *AEO2001* projects annual growth of 3.3 percent over the same period.

World Oil Prices

Comparisons with other oil price forecasts—including the International Energy Agency (IEA), Petroleum Economics Ltd. (PEL), Petroleum Industry Research Associates, Inc. (PIRA), Natural Resources Canada (NRCan), and Deutsche Banc Alex. Brown (DBAB)—are shown in Table 20 (IEA, 1998; PEL, February 2000; PIRA, October 2000; NRCan, April 1997; DBAB, June 2000). With the exception of IEA and PEL, the range between the *AEO2001* low and high world oil price cases spans the range of other published forecasts.

Table 20. Forecasts of world oil prices, 2000-2020

Total Energy Consumption

Report
- Entire AEO2001 (PDF)
- AEO2001 by Chapters (PDF)

Acronyms

Contacts

Feedback

Related Links

Assumptions to the AEO2001

Supplemental Data to the AEO2001 (Only available on the Web)
- Regional and more detailed AEO 2001 Reference Case Results
- 1998, 2000 to 2020

NEMS Conference

Forecast Homepage

EIA Homepage

The *AEO2001* forecast of end-use sector energy consumption over the next two decades shows far less volatility than has occurred historically. Between 1974 and 1984, volatile world oil markets dampened domestic oil consumption. Consumers switched to electricity-based technologies in the buildings sector, while in the transportation sector new car fuel efficiency nearly doubled. Natural gas use declined as a result of high prices and limitations on new gas hookups. Between 1984 and 1995, however, both petroleum and natural gas consumption rebounded, bolstered by plentiful supplies and declining real energy prices. As a consequence, new car fuel efficiency in 1995 was less than 2 miles per gallon higher than in 1984, and natural gas use (residential, commercial, and industrial) was almost 25 percent higher than it was in 1984.

Given potentially different assumptions about, for example, technological developments over the next 20 years, the forecasts from DRI, GRI, and WEFA have remarkable similarities with the *AEO2001* projections. Electricity is expected to remain the fastest growing source of delivered energy (Table 21), although its projected rate of growth is down sharply from historical rates in each of the forecasts, because many traditional uses of electricity (such as for air conditioning) approach saturation while average equipment efficiencies rise. Petroleum use and natural gas consumption are projected to grow at rates similar to those of recent years. For other fuels, future growth in consumption is expected to slow as a result of moderating economic growth, fuel switching, and increased end-use efficiency.

Table 21. Forecasts of average annual growth rates for energy consumption (percent)

Residential and Commercial Sectors

Growth rates for energy demand in the residential and commercial sectors are expected to decrease by more than 25 percent from the rates between 1984 and 1998, largely because of projected lower growth in population, housing starts, and commercial floorspace additions. Other contributing factors include increasing energy efficiency due to technical innovations and legislated standards; voluntary government efficiency programs; and reduced opportunities for additional market penetration of such end uses as air conditioning.

Differing views on the growth of new uses for energy contribute to variations among the forecasts. By fuel, electricity (excluding generation and transmission losses) remains the fastest growing energy source for both sectors across all forecasts (Table 22). All the forecasts project substantial growth in electricity use, with the *AEO2001*, DRI, and WEFA projections showing slower growth toward the end of the forecast. Natural gas use also is projected to grow but at lower rates, and projected petroleum use either is stable or continues to fall. GRI projects a more rapid decline in oil use, particularly for commercial space and water heating, than the other forecasts.

Table 22. Forecasts of average annual growth in residential and commercial energy demand (percent)

Industrial Sector

The projected growth rates for delivered energy consumption in the industrial sector range from 1.0 percent to 1.4 percent per year (Table 23). The *AEO2001* forecast is in the middle, at 1.2 percent. Generally, the projected growth rates are somewhat lower than the actual rates from 1984 to 1998. The decline is attributable to lower growth for GDP and manufacturing output. In addition, there has been a continuing shift in the industrial output mix toward less energy-intensive products.

The growth rates for different fuels in the industrial sector between 1984 and 1998 reflect a shift from petroleum products and coal to greater reliance on natural gas and electricity. In all the forecasts, natural gas use is expected to grow more slowly than in recent history, because much of the potential for fuel switching was realized during the 1980s. A key uncertainty in industrial coal forecasts is the environmental acceptability of coal as a boiler fuel.

Table 23. Forecasts of average annual growth in industrial energy demand (percent)

Transportation Sector

Overall fuel consumption in the transportation sector is expected to grow slightly more slowly than in the recent past in each of the forecasts (Table 24). All the forecasts anticipate continued rapid growth in air travel and considerably slower growth in light-duty vehicle travel. Demand for diesel fuel is expected to grow more slowly in all the forecasts than it has in the past.

GRI and WEFA project slower growth in gasoline demand as a result of slower growth in light-duty vehicle travel, and GRI projects more rapid efficiency improvements. GRI also projects the slowest growth in air travel of all the forecasts, leading to slower growth in jet fuel demand. For diesel fuel, however, GRI projects rapid growth in demand comparable to the *AEO2001* forecast, because it projects similar annual growth in freight travel.

Table 24. Forecasts of average annual growth in transportation energy demand (percent)

Electricity

Comparison across forecasts shows slight variation in projected electricity sales (Table 25). Sales projections for 2020 range from 1,485 billion kilowatthours (DRI) to 1,610 billion kilowatthours (WEFA) for the residential sector, as compared with the *AEO2001* reference case value of 1,701 billion kilowatthours. The forecasts for total electricity sales in 2020 range from 4,450 billion kilowatthours (DRI) to 4,503 billion kilowatthours (WEFA), compared with the *AEO2001* reference case value of 4,804 billion kilowatthours. All the projections for total electricity sales in 2020 fall below the range of the *AEO2001* low and high economic growth cases (4,516 and 5,135 billion kilowatthours, respectively). Different assumptions related to expected economic activity, coupled with diversity in the estimation of penetration rates for energy-efficient technologies, are the primary reasons for variation among the forecasts. All the forecasts compared here agree that stable fuel prices and slow growth in electricity demand relative to GDP growth will tend to keep the price of electricity stable—or declining in real terms—until 2020.

Table 25. Comparison of electricity forecasts (billion kilowatthours, except where noted)

Both the DRI and GRI forecasts assume that the electric power industry will be fully restructured, resulting in average electricity prices that approach long-run marginal costs. *AEO2001* also assumes that competitive pressures will grow and continue to push prices down until the later years of the projections. *AEO2001* also assumes that increased competition in the electric power industry will lead to lower operating and maintenance costs, lower general and administrative costs, early retirement of inefficient generating units, and other cost reductions. Further, in the DRI forecast, it is assumed that time-of-use electricity rates will cause some

flattening of electricity demand (lower peak period sales relative to average sales), resulting in better utilization of capacity and capital cost savings.

The distribution of sales among sectors affects the mix of capacity types needed to satisfy sectoral demand. Although the *AEO2001* mix of capacity among fuels is similar to those in the other forecasts, small differences in sectoral demands across the forecasts could lead to significant differences in the expected mix of capacity types. In general, recent growth in the residential sector, coupled with an oversupply of baseload capacity, results in a need for more peaking and intermediate capacity than baseload capacity. Consequently, generators are expected to plan for more combustion turbine and combined-cycle technology than coal, oil, or gas steam capacity.

Natural Gas

The differences among published forecasts of natural gas prices, production, consumption, and imports (Table 26) indicate the uncertainty of future market trends. Because the forecasts depend heavily on the underlying assumptions that shape them, the assumptions should be considered when different projections are compared. For instance, the forecast from GRI incorporates a cyclical price trend based on exploration and production cycles, which can be deceptive when isolated years are considered. In both 2015 and 2020, the forecast with the highest natural gas consumption is the *AEO2001* high economic growth forecast (33.36 and 36.09 trillion cubic feet, respectively); and the forecast with the lowest level is the DRI forecast (29.46 and 28.58 trillion cubic feet, respectively).

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

The National Petroleum Council (NPC) forecast shows the greatest expected growth in natural gas consumption between 1999 and 2015 in the residential and commercial sectors. The DRI forecast shows the lowest growth between 1999 and 2015 and also between 1999 and 2020. For residential consumption in 2015, the expected percentage increase over 1999 is 10 percentage points higher in the NPC forecast than in the DRI forecast; for commercial consumption the difference is 23 percentage points. The DRI forecast for commercial consumption is significantly lower than the other forecasts, due in part to definitional differences, and is even lower for 2020 than for 2015. Both the *AEO2001* reference and high economic growth forecasts for residential and commercial consumption exceed the other forecasts for 2020.

For industrial sector consumption of natural gas, the WEFA and DRI forecasts are not strictly comparable with the others because of differences in definitions. Among the remaining forecasts, the *AEO2001* reference, low economic growth, and high economic growth cases all project lower consumption in 2015 than do the GRI, AGA, and NPC reference cases. All the forecasts project the strongest growth in natural gas consumption for the electricity generation sector.

Domestic natural gas consumption is met by domestic production and imports. DRI projects the highest level of net imports, as well as the highest share of imports relative to total supply, in both 2015 and 2020. GRI's projection for 2015 is 1.7 trillion cubic feet lower than DRI's, corresponding to projected import shares of total supply at 12 percent and 19 percent, respectively. The forecasts available for 2020 are much more closely aligned. In general the projections for domestic production levels among the forecasts correspond to their projections for domestic consumption. GRI projects the highest production level in 2015, as well as relatively low import levels.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts			
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AG
2015							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**2.83**	**2.59**	**3.20**	**2.64**	**1.89**	**2.79**	**2**
Dry gas production[b]	**26.24**	**24.63**	**27.86**	**24.43**	**28.58**	**24.00**	**26**
Net imports	**5.50**	**5.35**	**5.62**	**5.35**	**4.01**	**5.70**	**4**
Consumption	**31.61**	**29.85**	**33.36**	**30.13**	**32.78**	**29.46**	**30**
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3
Industrial[c]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10
Electricity generators[f]	9.30	8.54	9.97	11.63[c]	8.72	9.25[g]	7
Other[h]	2.78	2.63	2.92	2.57	3.27	2.75	3
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.03	5
Industrial[c]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.
Electricity generators[f]	3.30	3.05	3.67	3.12[c]	2.55	3.24	2
2020							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**3.13**	**2.66**	**3.68**	**2.72**	**NA**	**3.07**	
Dry gas production[b]	**29.04**	**26.74**	**30.38**	**25.72**	**NA**	**25.13**	
Net imports	**5.80**	**5.58**	**5.82**	**5.72**	**NA**	**6.00**	
Consumption	**34.73**	**32.22**	**36.09**	**31.82**	**NA**	**28.58**	
Residential	6.14	5.95	6.21	5.88	NA	5.84	
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	
Industrial[c]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	
Electricity generators[f]	11.34	10.23	11.29	12.72[c]	NA	9.89[g]	
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.73	6.32	7.24	7.44	NA	7.25	
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	
Industrial[c]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	
Electricity generators[f]	3.66	3.17	4.17	3.20[c]	NA	3.52	

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore values for an isolated year may be misleading.

[b]Does not include supplemental fuels.

[c]Includes gas consumed in cogeneration.

[d]Excludes gas used for cogenerators and other nonutility generation.

[e]Excludes cogenerators' energy attributed to generating electricity

[f]Includes independent power producers and excludes cogenerators.

[g]Includes portion of cogeneration attributed to electricity generation

[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.

[i]Includes balancing item.

[j]Does not include certain State and local taxes levied on customers.

[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).

[l]Volume-weighted average of "system" gas and "transportation" gas.

NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,ı cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: **AEO2001:** AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). **WEFA:** Group, Natural Gas Outlook (2000). **GRI:** Gas Research Institute, GRI Baseline Projection of U.S. Energy Supp Demand, 2000 Edition (January 2000). **DRI:** Standard & Poor's DRI, U.S. Energy Outlook (Spring/Summer 200 American Gas Association, 1999 AGA-TERA Base Case (December 1999). **NPC:** National Petroleum Council, Meeting the Challenges of the Nation's Growing Natural Gas Demand (December 1999).

Back to Forecast Comparisons

Even with production levels closer to the mid-range, the NPC forecast projects the highest wellhead price in 2015. At the other extreme, GRI projects the lowest wellhead price and the highest production levels. By 2020 the wellhead price forecasts from WEFA and DRI fall within the range of the *AEO2001* low and high economic growth cases, but both the WEFA and DRI forecasts for domestic production are lower than that in the *AEO2001* low economic growth case. With one exception, all the forecasts for end-use prices follow the same ranking from highest to lowest as do the wellhead price forecasts for both 2015 and 2020.

For the residential and commercial sectors in 2015, WEFA projects the highest end-use margins relative to the wellhead. The lowest projections for residential (GRI) and commercial (AGA) margins are $1.10 and $1.02 per thousand cubic feet lower than WEFA's, respectively, a noticeable difference. The GRI forecast, projecting relatively low residential and commercial margins, projects the highest margin to electricity generators in 2015, at $0.23 above the lowest (AGA). AGA generally projects the lowest margins, but they do not include some State and local taxes. Because of definitional differences industrial prices are not as readily comparable, although on-system sale prices would generally be expected to be higher than an estimate of the average price to all industrial customers. With the exception of the *AEO2001* high economic growth case, margins to the industrial sector are expected to decline through 2015 in all the forecasts. The *AEO2001* and NPC forecasts project declines of less than 10 percent in the industrial margin from 1998 to 2015, whereas the projected decline in the GRI and AGA forecasts is over 20 percent.

Petroleum

Projected prices for crude oil in the *AEO2001* low and high oil price cases (Table 27) bound the 2010 and 2020 projections in five other petroleum forecasts: the *AEO2001* reference case, WEFA, GRI, DRI, and the Independent Petroleum Association of America (IPAA). Comparisons with GRI and IPAA forecasts, which do not extend to 2020, apply only to 2010. *AEO2001* shows the highest reference case price path of the five forecasts. The *AEO2001* reference case projection for the world oil price in 2010 is $2.89 per barrel above the WEFA projection, $3.20 above GRI, and $2.72 above DRI. In 2020, however, the *AEO2001* reference case projection is only $2.00 per barrel above the WEFA projection and $1.25 above the DRI projection.

Table 27. Comparison of petroleum forecasts (million barrels per day, except where noted)

Crude oil price forecasts are influenced by differing views of the projected composition of world oil production, such as the expansion of OPEC oil production and the timing of an expected recovery in East Europe/former Soviet Union oil production. Differences may also arise on the basis of different views of the strength of the U.S. economy and the timing and strength of economic recovery in southeast Asia.

All the forecasts except GRI project a significant decline in domestic oil production between 2000 and 2010, reflecting assumed declines in proved reserves. GRI projects a milder decline before 2005, followed by an upturn in production between 2005 and 2015. Both WEFA and DRI continue their downward production projections to 2020, at slower rates. *AEO2001* projects a sharper decline before 2010 than do the other four projections, resulting in a 2010 reference case projection for crude oil production that is at least 280,000 barrels per day below the other reference case forecasts.

The *AEO2001* reference case projects relatively little change in annual domestic oil production between 2010 and 2020, whereas the high world oil price case projects a slight recovery after 2010, leading to more production in 2020 than in 2010. As a result, projected production in 2020 in the *AEO2001* high oil price case is above the WEFA and DRI projections, whereas the *AEO2001* reference case projection is essentially the same as the WEFA projection. The *AEO2001* projections for production of natural gas liquids are within the range of the other forecasts. GRI projects the highest level of natural gas liquids production in 2010 at 2.69 million barrels per day and IPAA the lowest at 2.03 million barrels per day.

The three *AEO2001* cases, along with DRI and IPAA, project relatively high levels of petroleum consumption, mostly as a result of higher projections for gasoline consumption. WEFA and GRI project the lowest petroleum consumption in 2010 at around 21.5 million barrels per day. DRI projects the highest consumption in 2010, followed by IPAA, the *AEO2001* low oil price case, and the *AEO2001* reference case. DRI has the highest 2020 consumption projection, followed closely by the *AEO2001* low oil price case. The WEFA consumption projection is significantly lower than all other forecasts for 2020, mainly because WEFA expects lower consumption of transportation fuels. Despite a wide range of oil price assumptions, the three *AEO2001* cases show limited variation in their projections for gasoline consumption. The three *AEO2001* cases show significantly more distillate fuel consumption than do WEFA and DRI, mainly attributable to a higher projected rate of increase in freight travel.

The projections of net petroleum imports in the *AEO2001* low oil price case are well above those in the other forecasts, reflecting low production and high consumption projections. The projected percentage of petroleum consumption from imports, which is an indicator of the relative direction of production, net imports, and consumption, is also highest in the *AEO2001* low oil price case, followed by the DRI forecast. For 2010 the projected import share of consumption ranges from 52 percent (WEFA and IPAA) to 66 percent (*AEO2001* low oil price case). In 2020 all the forecasts show increased reliance on imports, with the highest projection being 70 percent in the *AEO2001* low oil price case. WEFA projects the lowest share of imports in 2020 at 56 percent, because it projects significantly lower petroleum consumption than in the other forecasts. WEFA actually projects lower import shares than were projected in its own forecast last year for both 2010 and 2020 and is the only forecast with lower projected import shares than last year.

Coal

The coal forecast by DRI is the most similar to the *AEO2001* coal forecasts; however, the coal forecasts by DRI, WEFA and GRI/Hill [96] all project lower production and overall consumption than does *AEO2001* (Table 28). The differences stem from differences in assumptions related to expected economic activity and sectoral growth in electricity demand and whether the forecast includes the effects of emissions limits proposed by the U.S. Environmental Protection Agency, which could force the retirement of many older coal plants. *AEO2001* represents the provisions of the State implementation plan (SIP) call for 19 States where NO_x caps were finalized but does not incorporate revised limits on emissions of particulate matter. The DRI forecast projects substantial gains in efficiency for coal-fired generators.

Table 28. Comparison of coal forecasts (million short tons, except where noted)

EIA projects growing domestic consumption over the forecast horizon in

combination with shrinking real coal prices. DRI expects some expansion of electricity and industrial sector coal consumption followed by declines beginning after 2010. Similarly, GRI/Hill predicts increases in coal consumption until 2013 followed by a decline. WEFA is the most pessimistic about coal consumption in the electricity generation and industrial sectors.

The differences among the forecasts for coal exports are significant. U.S. coal exports declined from 90 million tons in 1996 to 58 million tons in 1999, and net coal exports in 1999 (after adjustment for imports) were 49 million tons. EIA expects net exports to decline to 35 million tons in 2015 and remain approximately at that level through 2020. GRI/Hill projects an even more dramatic decline in net exports to 4 million tons in 2015 and 2 million tons in 2020, reflecting declining coal demands by importing countries and strong competition from other producers such as Australia, South Africa, and Colombia. The projections for a long-term decline in exports are based primarily on the inability of the U.S. mining industry to keep pace with strong price competition by other exporters and the loss of markets as Europe moves away from coal for environmental reasons. Both DRI and WEFA, however, project relative stability in U.S. net coal exports, at 57 million tons in 2015 and 55 million tons in 2020 (DRI) and 51 million tons in 2015 and 52 million tons in 2020 (WEFA).

The *AEO2001* and WEFA price forecasts for national average minemouth coal prices (all shown in 1999 dollars) are fairly close. The GRI/Hill minemouth price projections are somewhat lower than the other forecasts because they exclude exported and metallurgical coal in the calculation. (Exported and metallurgical coal tend to be more expensive.) In dollars per million Btu, WEFA's slightly lower projected prices at $0.62 in 2015 and $0.59 in 2020 indicate a slightly higher average Btu per ton conversion factor, which in turn indicates a higher proportion of bituminous (over subbituminous) coal in the WEFA forecast.

The coal forecasts reviewed provide a broad range of views, reflecting the great uncertainties facing the U.S. coal industry as it must simultaneously adapt to the financial pressures arising from increasing environmental restrictions on coal use (both here and in Europe), deregulation of the U.S. electricity generation industry, and increasing competition from the younger coal fields of international competitors. The uncertainties are, and will continue to be, passed on to U.S. coal producers in the form of demands for higher quality products at ever lower prices.

If you would like to received any information relating to any of our reports via e-mail, click on the link labeled "Projections ListServ" to Join by entering your e-mail address.

Page last modified on 06/29/2001 08:44:12

URL: http://www.eia.doe.gov/oiaf/aeo/forecast.html

Need Help Now?

Call the National Energy Information Center (NEIC)

(202) 586-8800 9AM - 5PM eastern time

Specialized Services from NEIC

If you are having technical problems with this site, please contact the EIA Webmaster at wmaster@eia.doe.gov

---

This document contains the following shortcuts:

3400.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3400.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	49000 LB	0	0	49,000	0	0	49,000	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	15000 LB	0	0	22,500	0	0	22,500	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	55500 LB	0	0	8,325	0	0	8,325	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	140000 LB	0	0	5,600	0	0	5,600	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	90000 LB	0	0	9,000	0	0	9,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	5000.00 LB	0	0	8,900	0	0	8,900	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	127,325	4,500	0	131,825	10985.42

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45. DISPOSALS								
3400.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	300.00 CY	0	0	0	12,000	0	12,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	450.00 TON	0	0	0	27,000	0	27,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	39,000	0	42,000	3500.00
3400.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	15000 LBS	0	0	0	7,800	0	7,800	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	7,800	0	7,800	650.00
3400.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	49000 LBS	0	0	0	22,540	0	22,540	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	22,540	0	22,540	1878.33
3400.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3400.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	8.00 EA	0	0	400	0	0	400	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	8.00 EA	0	0	0	4,000	0	4,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	400	4,000	0	14,000	1166.67
TOTAL DISPOSALS	12.00 MO	0	12,600	400	344,054	0	357,054	29754.48

John Spear
10/26/01 12:08 PM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Calculation of T&D costs

Harry, I think I copied you on the quote from Clean Harbors. If not let me know. This is a dressed up version of my calculations.

Jack

T&D calculations.xls

McCORMICK & BAXTER

10/25/01

CALCULATIONS OF T&D COSTS BASED ON QUOTE FROM CLEAN HARBORS
USED IN THE CD ESTIMATES

CARBON (GAC) DISPOSAL COSTS	QUOTED UNIT COSTS	VAPOR PH	LIQUID PHASE
Disposal (per pound)		0.350	0.290
Transportation			
Cost per load (say 30,000#/load	4,435.00		
Cost per pound		0.148	0.148
RO/RO Rental (say 30 days/load)	270.00		
Cost per pound		0.009	0.009
Liner	50.00		
Cost per pound		0.002	0.002
Haz Fee	1.92/ton	0.001	0.001
TOTALS		0.509	0.450
	Say for est.	0.520 per #	0.460

NAPL DISPOSAL COSTS		
Disposal 0.12/# at 8.5#/gal		1.020
Transportation		
Cost per load (5000 gal/load	4,620.00	
Cost per gallon		0.924
Loading/Unloading Demurrage Say 2 hours extra/loac	170.00	0.034
TOTALS		1.978
	Say for est.	1.980 per gal

John Spear
10/25/01 10:11 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Clean Harbors T&D Quote

Harry,
Here is the quote from Clean Harbors for your backup.
Jack
—— Forwarded by John Spear/Cranford/URSCorp on 10/25/2001 01:17 PM ——

rowlandd@cleanharbors.com (Rowland, Dave)
10/24/2001 06:14 PM

To: "'john_spear@urscorp.com'" <john_spear@urscorp.com>
cc:
Subject: Stockton project

John;

I hope this helps. Call me with any questions

<<URS- CA NJ.doc>>

Dave Rowland
Clean Harbors Environmental Services
800-462-4678 Ext 228

URS- CA NJ.doc

July 3, 2001

URS Corporation
12 Commerce Drive
Cranford, NJ 07016
Attn. Jack Spear

Re: Budgetary numbers- Creosote Liquids

Dear Jack

Thank you for the opportunity to provide this budgetary estimate for the transportation and disposal of Creosote contaminated liquids coming from your California site. Although this project is merely in the planning stages, the cost estimates below should assist in your planning efforts.

Similar to wastes generated at other remediation sites, Clean Harbors (CHES) is familiar with ceosote contamination and we are looking forward to further discussions pertinent to this project. As you move forward, please don't hesitate to contact me with any questions you may have.

As mentioned, Creosote contaminated waste is suitable for incineration at our RCRA/CERCLA approved incinerator in Kimball, NE. Because of its relative proximity to the site, and our ability to receive both liquids and solids via rail, Kimball offers significant advantages over other disposal sites.

In the past two years, our Kimball, NE fluidized- bed incinerator has undergone several improvements that have led to record breaking incineration levels. Since our initial purchase of the incinerator in 1995, CHES has enhanced the feed and processing capabilities, added shredders and permitted pad storage space, replaced refractory linings and has recently completed construction of our second of six permitted monofills. These improvements will enable CHES to continue to incinerate wastes well into the millenium.

The inherent design of a fluidized bed incinerator enables CHES to offer aggressive pricing to customers requiring incineration of bulk solids, sludges and liquids. Additionally, Kimball is the <u>only</u> incinerator in the United States that is capable of delisting the ash produced from the incineration process, virtually eliminating long-term liability associated with hazardous waste landfills.

Attached you will find transportation and disposal pricing based upon the general knowledge of contaminated material from previous projects.

Our fleet of transportation equipment, coupled with our selected subcontracted transportation companies enables Clean Harbors to transport a variety of hazardous wastes without offloading demurrage, often reducing demurrage costs with a streamlined coordination effort. For this project we can utilize 5,000 gallon vacuum trailers from our Kimball site or Thousand Oaks, CA location. Further, we may utilize local approved subcontractors for proper transportation of your waste.

As you move forward with the planning of this project please contact us with any planning or logistical questions you may have. We are eager to work with you and will be contacting you soon to follow up on this quotation. If you have any questions in the meantime, please contact us at the Denver office at 1-800-462-4678 Ext, 228.

Sincerely,

Dave Rowland

Senior Account Manager

URS Corporation **July 3, 2001**

I. DISPOSAL:

a. **Creosote contaminated Liquids** **$0.08-$0.16/lb/lb.**
Minimum charge applies per load

General Specifications

FB1K BULK LIQUID/ENERGETIC FOR KIMBALL
BTU 6,000 - 10,000/lb
Metals within normal feed rates
Halogen less than 5%
Sulfur less than 3%
No pesticides/level A requirements
Na/K/Mg/P each less than .5%
Ash less than 5%
Settleable solids less than 5%
Viscosity of #4 fuel oil or better
PRIMARY DISPOSAL METHOD: DESTRUCTION INCINERATION

b. **Creosote Contaminated Carbon- Vapor Phase**
$0.34- $0.36/lb-
Bulk Quantity

c. **Creosote Contaminated Carbon- Liquid Phase**
$0.26 - $0.32/lb
Bulk Quantity

General Specifications

FB5 SOLID FUEL NOT PROCESSABLE (DEBRIS)
Less than 10% metal pieces
All metal pieces less than 6 inches longest dimension
No metal fines
Less than 30% inorganic material
Less than 10% halogens
Less than 50 ppm PCB's, non-TSCA regulated
Less than 4% sulfur
Greater than 5000 BTU's/lb
No pesticides
Non-dispersible solids (e.g. cured resins, rags, filters)
PRIMARY DISPOSAL METHOD: FUELS BLENDING

II. TRANSPORTATION

From Stockton to Kimball

a.	**Liquids to Kimball**	$4,620.00 per load Loading time: 2hrs $85.00/hr thereafter
b.	**Rolloffs to Kimball**	$4,435.00/load
c.	**Spot Fee**	TBD
d.	**Roll-off Rental**	$9.00/Day
e.	**Roll-off Liner**	$50.00/each

NOTE- scheduling of roll-off wastes into Kimball is most efficient when performed in a drop and swap mode. CHES will provide an empty roll-off to each driver upon delivery of full box.

III. State Hazardous Fee: NE- $1.92/Ton

IV. Analysis:

Basic Waste Approval fee	$75.00- WAIVED UPON FIRST SHIPMENT (Specific analysis, if needed will be additional)

The aforementioned prices are based upon the following conditions & assumptions:

1. Estimate prices only for budgetary needs
2. This project will commence upon agreement of Terms and conditions and a purchase order.
3. CHES will negotiate a mutually agreeable delivery schedule upon award.
4. Materials subject to additional charges if they do not conform to the listed specifications.
5. All containers must be marked with a CHES profile number
6. Client will provide free and clear access to work area for equipment and manpower.
7. Due to recent escalating fuel costs, a temporary 3% OPEC fuel surcharge will be added to each invoice.

We are very proud of our excellent compliance record. When outside disposal services are necessary, CHES only ships to facilities that pass our annual compliance audit, in addition to any disposal restrictions the generator may have. Our fleet of trucks is inspected daily to assure you of safe and dependable transportation of your hazardous waste. In addition, each truck is fitted with a satellite tracking system that enables constant communication with our dispatch personnel.

Finally, we offer waste tracking for all of your wastes through our on-line tracking system. This service is offered on a monthly, quarterly or yearly basis or is available on our Web site at www.Clean Harbors.com. Pricing is firm for 30 days and terms are NET15 commencing the last day of work being performed at the job site listed on the invoice.

Should you have any questions or need additional information, please contact me at 1-800-462-4678 in our Denver Service Center. We sincerely appreciate this opportunity to quote on your waste disposal services.

Metals Feed Limits- ppm

Antimony (Sb)	**1,155**
Arsenic (As)	**75**
Barium (Ba)	**4,050**
Beryllium (Be)	**10**
Cadmium (Cd)	**100**
Chromium (Cr)	**1,000**
Lead (Pb)	**7,995**
Mercury (Hg)	**10.0**
Nickel (Ni)	**12,450**
Selenium (Se)	**255**
Silver (Ag)	**255**
Thallium (Tl)	**37.5**

NOTE:
Wastes must not qualify as Inorganic Metal Bearing Wastes, which EPA prohibits from incineration

Table 7-1
Estimates of GAC Consumption by Liquid Stream Treatment

Visalia data used for scaling				
Liquid pumping rate	400	gpm		
First 6 months average	23,333	lbs/month		
Second year average	16,667	lbs/month		
Third year average	8,333	lbs/month		
Pump-and treat usage	1,667	lbs/month		
McCormick-Baxter estimates	Scenario 1	Scenario 2	Scenario 3	
Pumping rate	475	575	700	gpm
Montly usage 1st yr	27,708	33,542	40,833	lbs/month
Montly usage 2nd yr	23,750	28,750	35,000	lbs/month
Montly usage 3rd yr	14,844	17,969	21,875	lbs/month
Montly usage 4th yr	9,896	11,979	14,583	lbs/month
Usage during cooldown yr 1	5,938	7,188	8,750	lbs/month
Usage during cooldown yr 2	3,958	4,792	5,833	lbs/month
Usage during cooldown yr 3	1,979	2,396	2,917	lbs/month
Estimated total, sacrificial	1,056,875	1,279,375	1,557,500	lbs
Changeout frequency, 10,000 lb primary vessels (times per year)				
Year 1	33	40	49	times
Year 2	29	35	42	times
Year 3	18	22	26	times
Year 4	12	14	18	times
Year 5	7	9	11	times
Year 6	5	6	7	times
Year 7	2	3	4	times
Estimated regeneration frequency (times per month)[1]				
Year 1	6	7	8	times
Year 2	5	6	7	times
Year 3	3	4	4	times
Year 4	2	2	3	times
Year 5	1.2	1.4	1.8	times
Year 6	0.8	1.0	1.2	times
Year 7	0.4	0.5	0.6	times
Estimated carbon usage using regeneration on-site[2]				
Year 1	33,250	40,250	49,000	lbs
Year 2	28,500	34,500	42,000	lbs
Year 3	17,813	21,563	26,250	lbs
Year 4	11,875	14,375	17,500	lbs
Year 5	7,125	8,625	10,500	lbs
Year 6	4,750	5,750	7,000	lbs
Year 7	2,375	2,875	3,500	lbs
Estimated total, regeneration on-site	105,688	127,938	155,750	lbs
1) Assumed that the vessels are regenerated when they are 50% loaded				
2) The carbon will be replaced after 20 regeneration cycles				

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.49. SAMPLING & ANALYSIS								
3400.49. 5. PERFORMANCE MONITORING								
3400.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3400.49.10. COMPLIANCE MONITORING								
3400.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3400.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3400.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00	0.00	950.00	0.00	0.00	950.00	950.00

3400.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00	EA	0	0	0	1,015	0	1,015	203.00
10)									
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00	EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	5.00	EA	0	0	0	200	0	200	40.00
USR AA TPH			0.00	0.00	0.00	87.00	0.00	87.00	
	5.00	EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	2.00	EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00	EA	0	0	396	0	0	396	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00	EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)			0.00	0.00	0.00	740.00	0.00	740.00	
	8.00	EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00	MO	0	0	5,174	8,695	0	13,869	1155.76
3400.49.10.20. GWTP DISCHARGE TO REINJECT WELLS									
USR AA TPH			0.00	0.00	0.00	60.00	0.00	60.00	
	14.00	EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00	EA	0	0	0	1,960	0	1,960	140.00
10)									
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00	EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	14.00	EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290			0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00	EA	0	0	0	4,750	0	4,750	950.00

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3400.49.10.25. SAMPLING TECHNICIANS

3400.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3400.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3400.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91

Kathryn Carpenter
06/29/01 07:57 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP, Wendy LS Oresik/Seattle/URSCorp@URSCORP, John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: M&B CD Compliance Monitoring analytical unit costs

Good Morning,

Here is a spreadsheet with unit costs for soil/solid, NAPL, GW, and air/vapor samples. Let me know if I missed anything or you need more backup. One thing we need to figure out is how to monitor for ozone. Can this be done with an onsite monitor? The AirToxics lab does not do this test so I suspect it needs to be done in the field.

compliance monitoring analysis unit cost

Kathryn A. Carpenter, MS
Senior Environmental Chemist
URS Corporation
1501 4th Ave., Suite 1400
Seattle, WA 98101-1616
(206) 438-2053 (phone)
(206) 438-2699 (fax)

Analyte	Method	NAPL	Soil/Solids	GW	Air/Vapor
TOC	9060			$55	
TPH	TPH-Dx	$87	$70	$60	
PAHs *	8310	$203	$161	$140	$220
PCP *	8270 mod	$225	$180	$155	$200
Metals (As, Cu, Cr, Zn)	6000/7000		$45	$40	
TCLP (metals, VOC, SVOC)	TCLP		$740		
Dioxin/Furans	8290			$950	
Natural Attenuation Parameters (dissolved methane, ethane, ethene)	RSK 175			$75	
TO13 (SVOC compounds)	TO13				$275
Carbon dioxide	ASTM D-1946				$115
Carbon monoxide	ASTM D-1946				incl.
Sulfur oxides	ASTM D-1946				$150
NO2	ASTM D-1946				incl.
O3	TBD				TBD
VOC	ASTM D-1946				$220
PM10	PM10				$35

References:
Unit costs for NAPL, soil/solids, and GW from URS Cost Estimating Database (June 2001)
Unit costs for air/vapor from AirToxics
* PCP and PAHs for air/vapor included in TO13 - this price is for reporting PCP or PAHs only

Table 6-1
Overview of Sampling Frequency for Subsurface ERT and Temperature Monitoring

	General Site Coverage		Vertical Plane South of Slough		Horizontal Plane Under Slough	New P&T Extraction Wells	New P&T Monitoring Wells
Phase	**ERT**	**DTS**	**ERT**	**DTS**	**ERT**	**DTS**	**DTS**
Heat-up	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily
Flushing/cycling	Monthly	Weekly	Monthly	Weekly	Daily	Weekly	Weekly
Cool-down	Quarterly	Monthly	Quarterly	Monthly	Weekly	Monthly	Monthly
Long-term monitoring	NA	NA	NA	NA	NA	NA	Quarterly

Table 6-2
National Ambient Air Quality Standards

Constituent	Standard value ($\mu g/m^3$)	Standard Type
CO		
1- Hour average	40 mg/m^3	Primary
8-Hour average	10 mg/m^3	Primary
NO_2		
Annual arithmetic mean	100	Primary and secondary
O_3		
1-Hour average	235	Primary and secondary
8-Hour average	157	Primary and secondary
Pb		
Quarterly average	1.5	Primary and secondary
PM_{10}		
Annual arithmetic mean	50	Primary and secondary
24-Hour average	150	Primary and secondary
SO_2		
Annual arithmetic mean	80	Primary
24-Hour average	365	Primary and secondary
3-Hour average	1,300	Primary and secondary

Note: Units in microgram per cubic meter of air, unless otherwise noted.

Table 6-3
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Activity	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring – Steam Phase					
ERT data	Subsurface	Temperature	Daily/weekly/ monthly (see Table 6-1)	41 to 63 vertical 4 horizontal	NA
Electrical	System	Amps and power	Weekly	59 ERH electrodes	NA
Temperature/DTS distribution	Wellhead	Temperature	Daily/weekly (see Table 6-1)	301 to 416 wells	NA
Steam distribution	Wellhead	Liquid flow	Continuous	169 to 249	NA
	Wellhead, boiler plant, treatment plant	Pressure	Continuous	200 to 300	NA
Contaminant removal rate	NAPL (at wellhead)	Volume	Weekly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Weekly	4 to 6	NA
		TOC	Weekly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Well installation soil borings[b]	Soil	Visual	Initial	20	20
		TPH	Confirmation	20	20
		PAHs	Confirmation	20	20
		PCP	Confirmation	20	20
Interim drill-back soil borings	Soil	TPH	Annual[c]	50[d]	50[d]
		PAHs	Annual[c]	50[d]	50[d]
		PCP	Annual[c]	50[d]	50[d]
Groundwater monitoring[b]	Water	TOC	Initial	60	60
		PAHs	Initial	60	60
		PCP	Initial	60	60
		Metals[e]	Initial	60	60
		Dioxins/furans	Initial	10	10
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Cool Down Phase					
Temperature/DTS distribution	Subsurface	Temperature	Monthly (see Table 6-1)	301 to 416 wells	NA
Contaminant removal rate	NAPL (at well-head)	Volume	Monthly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Monthly	4 to 6	NA
		TOC	Monthly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring – Cool Down Phase (Continued)					
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Compliance Monitoring – Steam Phase					
Boiler air emissions/ stack monitoring	Gas	VOCs	Initial	1	4[f]
		SVOCs[g]	Initial	1	4[f]
		Dioxins/furans	Initial	1	4[f]
		Metals[h]	Initial	1	4[f]
		PM	Initial	1	4[f]
		HCl	Initial	1	4[f]
		Cl_2	Initial	1	4[f]
		Total hydrocarbons	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
		Opacity	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Monthly	3	36
		PCP	Monthly	3	36
		PM_{10}	Monthly	3	36
		Metals	Monthly	3	36
		CO	CEMS	3	NA
		SO_x	CEMS	3	NA
		NO_2	CEMS	3	NA
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Quarterly	1	4
		PAHs	Quarterly	1	4
		PCP	Quarterly	1	4
		Metals[e]	Quarterly	1	4
		Dioxins/furans	Quarterly	1	4
	Solids (well)	TCLP[i]	Quarterly	1	4
	Solids (SAC)	TCLP[i]	Quarterly	1	4
	Solids (sludge)	TCLP[i]	Quarterly	1	4
	Solids (spent filter media)	TCLP[i]	Quarterly	1	4
Perimeter groundwater monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Cap/Down Phase					
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Annually	1	1
		PAHs	Annually	1	1
		PCP	Annually	1	1
		Metals[e]	Annually	1	1
		Dioxins/furans	Annually	1	1
	Solids (well)	TCLP[i]	Annually	1	1
	Solids (SAC)	TCLP[i]	Annually	1	1
	Solids (sludge)	TCLP[i]	Annually	1	1
	Solids (spent filter media)	TCLP[i]	Annually	1	1
Perimeter groundwater monitoring	Water	TPH	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Confirmational Sampling					
Soil borings	Soil	LIF survey	Final	4 weeks	4 weeks
		NAPL mobility leach test[j]	Final	10	10
		TPH	Final	10	10
		PAHs	Final	10	10
		PCP	Final	10	10
Long-Term Monitoring (30 years)					
Groundwater monitoring (perimeter and treatment zones)	Water	PAHs	Annually	25	25
		PCP	Annually	25	25

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

[a]Total number of samples does not include QA samples. QA samples are 10% per batch.
[b]Includes baseline sampling and analysis during system (e.g., wells) installation.
[c]Will be conducted for years 2, 3, and 4 (i.e., 3 times over the course of the steam treatment period).
[d]Assumes 5 samples from each of 10 borings.
[e]Metals include As, Cr, Cu, and Zn.
[f]Includes 3 samples taken from 1 boiler stack and 1 blank.
[g]SVOCs include PAHs and PCP.
[h]40 CFR 266.106 provides standards to control metals emissions. Subpart I regulated metals include Ag, As, Ba, Be, Cd, Cr, Hg, Pb, Sb, and Th. Of these metals, As and Cr are of concern at the site.
[i]Leachate from TCLP analyzed for As, Cr, and SVOCs
[j]NAPL Mobility Product Leaching Study, methodology leach test to be determined.

Notes:
Performance monitoring: Monitor system performance during remediation. Includes steam phase and cool-down period.
Compliance monitoring: Monitor compliance with disposal/discharge requirements. Includes steam phase and cool down period.
Confirmational sampling: To confirm "long-term effectiveness" of the remediation performed.

Ag: silver
As: arsenic
Ba: barium
Be: beryllium
CEMS: continuous emissions monitoring system
Cd: cadmium
CO: carbon monoxide
CO_2: carbon dioxide
COCs: chemicals of concern (PAHs, PCP, dioxins/furans, As, Cr, Cu, and Zn)
Cl_2: chlorine gas
Cr: chromium
Cu: copper
HCl: hydrogen chloride
Hg: mercury
LIF: laser-induced fluorescence
NO_x: nitrogen oxides
O_3: ozone
PAHs: polynuclear aromatic hydrocarbons
Pb: lead
PCP: pentachlorophenol
PM: particulate matter
SAC: spent activated carbon
Sb: antimony
SO_x: sulfur oxides
SVOCs: semivolatile organic compounds
TAPs: toxic air pollutants
TCLP: toxicity characteristics leaching procedure
Th: thallium
TOC: total organic carbon
TPH: total petroleum hydrocarbons
VOCs: volatile organic compounds
Zn: zinc

Table 6-5
Perimeter Monitoring Wells to Be Sampled

Scenario	Zone				
	A	B	C	D	E
1	7	6	6	3	3
2	7	6	4	3	3
3	7	6	4	3	3

Table 6-6
Perimeter Monitoring Frequency

Years[1]	Scenario	Zone				
		A	B	C	D	E
0-7	1	Semi-annually				
	2					
	3					
7-30	1	Annually	Annually	Annually	5-years	5-years
	2	Annually	Annually	Annually	5-years	5-years
	3	Annually	Annually	Annually	5-years	5-years

[1]Years are from start of thermal remediation.

3400.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.55. QC & ANALYTICAL DATA VALIDATION								
3400.55. 5. DATA VALIDATION								
3400.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3400.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3400.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3400.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 1ST YEAR O&M	12.00 MO	1,089,932	64,060	198,775	1,043,868	10090227	12,486,862	1040571.86

3405. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405. 2ND YEAR O&M								
3405. 5. GENERAL CONDITIONS								
3405. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3405. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3405. 5.10. ERH SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERH SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
3405. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	513,824	1,878	581,909	48492.40

3405.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3405.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3405.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3405.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3405.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	2224765 MBT	0	0	0	0	7,786,678	7,786,678	3.50
@ $3.50								
USR AA Electricity for Electrodes		0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	32237 KKW	0	0	0	0	1,934,220	1,934,220	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	32237 KKW	0	0	0	0	-1934220	-1,934,220	-60.00
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	15768 KKW	0	0	0	0	946,080	946,080	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	187114 UNT	0	0	0	0	149,691	149,691	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	8,889,625	8,889,625	740802.06

3405.35. SITE O&M LABOR & MISC EQUIPME	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

3405.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	42000 LB	0	0	42,000	0	0	42,000	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	15000 LB	0	0	22,500	0	0	22,500	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	55500 LB	0	0	8,325	0	0	8,325	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	140000 LB	0	0	5,600	0	0	5,600	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	90000 LB	0	0	9,000	0	0	9,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	5000.00 LB	0	0	8,900	0	0	8,900	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	120,325	4,500	0	124,825	10402.08

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45. DISPOSALS								
3405.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	300.00 CY	0	0	0	12,000	0	12,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	450.00 TON	0	0	0	27,000	0	27,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	39,000	0	42,000	3500.00
3405.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	15000 LBS	0	0	0	7,800	0	7,800	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	7,800	0	7,800	650.00
3405.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	42000 LBS	0	0	0	19,320	0	19,320	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	19,320	0	19,320	1610.00
3405.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3405.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3405.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	8.00 EA	0	0	400	0	0	400	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	8.00 EA	0	0	0	4,000	0	4,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	400	4,000	0	17,360	1446.67
TOTAL DISPOSALS	12.00 MO	0	15,960	400	340,834	0	357,194	29766.14

3405.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.49. SAMPLING & ANALYSIS									
3405.49. 5. PERFORMANCE MONITORING									
3405.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	52.00	EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	52.00	EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	304.16	0.00	0.00	304.16	
	14.00	EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)			0.00	0.00	0.00	55.00	0.00	55.00	
	58.00	EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
3405.49. 5.10. SOIL SAMPLING (DRILL BACK)									
M HTW AA Total Petroleum Hydrocarbons (TPH)			0.00	0.00	0.00	87.00	0.00	87.00	
	52.00	EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	0.00	161.00	0.00	161.00	
	52.00	EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)			0.00	0.00	0.00	180.00	0.00	180.00	
	52.00	EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe			0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00	LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes			0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00	LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist			59.40	0.00	0.00	0.00	0.00	59.40	
	60.00	HR	3,564	0	0	0	0	3,564	59.40

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3405.49.10. COMPLIANCE MONITORING								
3405.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3405.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3405.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3405.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3405.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3405.49.10.25. SAMPLING TECHNICIANS

3405.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3405.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3405.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3405.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.55. QC & ANALYTICAL DATA VALIDATION									
3405.55. 5. DATA VALIDATION									
3405.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3405.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3405.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
3405.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50

3405.60. DEMOBE/DEMO SPH 6PH COMPONENT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3405.60. DEMOBE/DEMO SPH 6PH COMPONENTS								
USR AA Remove/Salvage SPT 6ph		0.00	0.00	0.00	37452.00	0.00	37452.00	
Aboveground Components	1.00 LS	0	0	0	37,452	0	37,452	37452.00
TOTAL DEMOBE/DEMO SPH 6PH COMPONENT	1.00 JOB	0	0	0	37,452	0	37,452	37452.00
TOTAL 2ND YEAR O&M	12.00 MO	1,093,804	67,420	181,775	1,154,356	8,904,699	11,402,054	950171.17

3410. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410. 3RD YEAR O&M								
3410. 5. GENERAL CONDITIONS								
3410. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3410. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3410. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3410.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3410.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3410.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3410.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3410.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	1906935 MBT	0	0	0	0	6,674,273	6,674,273	3.50
@ $3.50								
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	10512 KKW	0	0	0	0	-630,720	-630,720	-60.00
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	10512 KKW	0	0	0	0	630,720	630,720	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	140160 UNT	0	0	0	0	112,128	112,128	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	6,793,577	6,793,577	566131.38

3410.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3410.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	26250 LB	0	0	26,250	0	0	26,250	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	15000 LB	0	0	22,500	0	0	22,500	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	55500 LB	0	0	8,325	0	0	8,325	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	140000 LB	0	0	5,600	0	0	5,600	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	90000 LB	0	0	9,000	0	0	9,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	5000.00 LB	0	0	8,900	0	0	8,900	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	6000.00 LB	0	0	12,000	0	0	12,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	104,575	4,500	0	109,075	9089.58

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45. DISPOSALS								
3410.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	300.00 CY	0	0	0	12,000	0	12,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	450.00 TON	0	0	0	27,000	0	27,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	39,000	0	42,000	3500.00
3410.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	15000 LBS	0	0	0	7,800	0	7,800	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	7,800	0	7,800	650.00
3410.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	26250 LBS	0	0	0	12,075	0	12,075	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	12,075	0	12,075	1006.25
3410.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3410.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3410.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	8.00 EA	0	0	400	0	0	400	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	8.00 EA	0	0	0	4,000	0	4,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	400	4,000	0	17,360	1446.67
TOTAL DISPOSALS	12.00 MO	0	15,960	400	333,589	0	349,949	29162.39

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.49. SAMPLING & ANALYSIS								
3410.49. 5. PERFORMANCE MONITORING								
3410.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3410.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3410.49.10. COMPLIANCE MONITORING								
3410.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3410.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3410.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83 10)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3410.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3410.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3410.49.10.25. SAMPLING TECHNICIANS

3410.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3410.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3410.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3410.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3410.55. QC & ANALYTICAL DATA VALIDATION									
3410.55. 5. DATA VALIDATION									
3410.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3410.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3410.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
3410.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL 3RD YEAR O&M	12.00	MO	1,093,804	67,420	166,025	763,235	6,808,651	8,899,135	741594.57

3415. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415. 4TH YEAR O&M								
3415. 5. GENERAL CONDITIONS								
3415. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3415. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3415. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3415.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3415.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3415.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3415.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3415.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU @ $3.50			0.00	0.00	0.00	0.00	3.50	3.50	
	1589114	MBT	0	0	0	0	5,561,899	5,561,899	3.50
USR AA Electircity for Pumps, Treatment Plant, Steam: $60 per K KWH			0.00	0.00	0.00	0.00	60.00	60.00	
	10512	KKW	0	0	0	0	630,720	630,720	60.00
USR AA Co-gen System Power Makeup			0.00	0.00	0.00	0.00	-60.00	-60.00	
	10512	KKW	0	0	0	0	-630,720	-630,720	-60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit			0.00	0.00	0.00	0.00	0.80	0.80	
	140160	UNT	0	0	0	0	112,128	112,128	0.80
USR AA Water Meter Service Charge: 198.00/mon			0.00	0.00	0.00	0.00	198.00	198.00	
	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	5,681,203	5,681,203	473433.58

3415.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3415.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	17500 LB	0	0	17,500	0	0	17,500	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	10000 LB	0	0	15,000	0	0	15,000	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	50000 LB	0	0	7,500	0	0	7,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	120000 LB	0	0	4,800	0	0	4,800	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	80000 LB	0	0	8,000	0	0	8,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	4000.00 LB	0	0	7,120	0	0	7,120	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	79,920	4,500	0	84,420	7035.00

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45. DISPOSALS								
3415.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	300.00 CY	0	0	0	12,000	0	12,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	450.00 TON	0	0	0	27,000	0	27,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	39,000	0	42,000	3500.00
3415.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.52	0.00	0.52	
	10000 LBS	0	0	0	5,200	0	5,200	0.52
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	5,200	0	5,200	433.33
3415.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	17500 LBS	0	0	0	8,050	0	8,050	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,050	0	8,050	670.83
3415.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67

3415.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3415.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	8.00 EA	0	0	400	0	0	400	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	8.00 EA	0	0	0	4,000	0	4,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	400	4,000	0	17,360	1446.67
TOTAL DISPOSALS	12.00 MO	0	15,960	400	326,964	0	343,324	28610.31

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.49. SAMPLING & ANALYSIS								
3415.49. 5. PERFORMANCE MONITORING								
3415.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3415.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
3415.49.10. COMPLIANCE MONITORING								
3415.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
3415.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
3415.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
3415.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	12.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	12.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	60	0	0	60	5.02

3415.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35
3415.49.10.25. SAMPLING TECHNICIANS								
3415.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3415.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00

3415.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75

3415.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.55. QC & ANALYTICAL DATA VALIDATION								
3415.55. 5. DATA VALIDATION								
3415.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3415.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3415.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
3415.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50

3415.60. REMOVE/DEMO STEAM EQUIPMENT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3415.60. REMOVE/DEMO STEAM EQUIPMENT								
3415.60. 5. DEMOLITION/REMOVAL EQUIPMENT								
MIL AA Outside Equip. Operators, Med		56.51	0.00	0.00	0.00	0.00	56.51	
ium	80.00 HR	4,520	0	0	0	0	4,520	56.51
MIL AA Outside Laborers, (Semi-Skill		38.39	0.00	0.00	0.00	0.00	38.39	
ed)	320.00 HR	12,285	0	0	0	0	12,285	38.39
MIL AA Outside Plumbers		50.69	0.00	0.00	0.00	0.00	50.69	
	80.00 HR	4,055	0	0	0	0	4,055	50.69
MIL AA CRANE,HYD,TRK MTD, 4.5T/52'B		0.00	4.37	0.00	0.00	0.00	4.37	
OOM	80.00 HR	0	350	0	0	0	350	4.37
(ADD FLAT BED 43,000GVW TRUCK)								
TOTAL DEMOLITION/REMOVAL EQUIPMENT	1.00 JOB	20,860	350	0	0	0	21,210	21210.15
3415.60.10. DISPOSALS								
USR AA Disposal Misc Piping &		0.00	0.00	0.00	100.00	0.00	100.00	
Equipment, RCRA Landfill	100.00 TON	0	0	0	10,000	0	10,000	100.00
TOTAL DISPOSALS	1.00 JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00 MO	20,860	350	0	10,000	0	31,210	2600.85
TOTAL 4TH YEAR O&M	12.00 MO	1,114,665	67,770	141,370	766,610	5,696,277	7,786,691	648890.95

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420. 5TH YEAR O&M								
3420. 5. GENERAL CONDITIONS								
3420. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3420. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3420. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3420.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3420.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3420.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3420.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3420.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment			0.00	0.00	0.00	0.00	60.00	60.00	
	7008.00	KKW	0	0	0	0	420,480	420,480	60.00
Plant: $60/K Kwh									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	14016	UNT	0	0	0	0	11,213	11,213	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	438,869	438,869	36572.40

3420.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3420.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	10500 LB	0	0	10,500	0	0	10,500	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	50000 LB	0	0	7,500	0	0	7,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	120000 LB	0	0	4,800	0	0	4,800	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	80000 LB	0	0	8,000	0	0	8,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	4000.00 LB	0	0	7,120	0	0	7,120	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	57,920	4,500	0	62,420	5201.67

3420.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.45. DISPOSALS								
3420.45. 5. SLUDGE Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	300.00 CY	0	0	0	12,000	0	12,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	450.00 TON	0	0	0	27,000	0	27,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	39,000	0	42,000	3500.00
3420.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	10500 LBS	0	0	0	4,830	0	4,830	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	4,830	0	4,830	402.50
3420.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3420.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3420.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00

3420.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Additional Labor for Recurrin g			0.00	0.00	0.00	500.00	0.00	500.00	
Loadouts & Waste Handling	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	317,044	0	333,254	27771.14

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49. SAMPLING & ANALYSIS								
3420.49. 5. PERFORMANCE MONITORING								
3420.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3420.49.10. COMPLIANCE MONITORING								
3420.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3420.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3420.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3420.49.10.25. SAMPLING TECHNICIANS

3420.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3420.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3420.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3420.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3420.55. QC & ANALYTICAL DATA VALIDATION									
3420.55. 5. DATA VALIDATION									
3420.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3420.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3420.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 5TH YEAR O&M	12.00	MO	1,081,022	67,420	114,470	672,759	452,533	2,388,204	199017.01

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425. 6TH YEAR O&M								
3425. 5. GENERAL CONDITIONS								
3425. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3425. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3425. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3425.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

3425.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3425.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3425.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

3425.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.30. UTILITIES									
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.									
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.									
Makeup water requirements.									
Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment			0.00	0.00	0.00	0.00	60.00	60.00	
	7008.00	KKW	0	0	0	0	420,480	420,480	60.00
Plant: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	14016	UNT	0	0	0	0	11,213	11,213	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	438,869	438,869	36572.40

3425.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3425.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	7000.00 LB	0	0	7,000	0	0	7,000	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	50000 LB	0	0	7,500	0	0	7,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	120000 LB	0	0	4,800	0	0	4,800	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	80000 LB	0	0	8,000	0	0	8,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	4000.00 LB	0	0	7,120	0	0	7,120	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	54,420	4,500	0	58,920	4910.00

3425.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.45. DISPOSALS								
3425.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3425.45.15. CARBON (GAC, LIQUID PHASE)								
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	7000.00 LBS	0	0	0	3,220	0	3,220	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,220	0	3,220	268.33
3425.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3425.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3425.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00

3425.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	302,434	0	318,644	26553.64

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49. SAMPLING & ANALYSIS								
3425.49. 5. PERFORMANCE MONITORING								
3425.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
3425.49.10. COMPLIANCE MONITORING								
3425.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Allow		0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.		0.00	0.00	925.00	0.00	0.00	925.00	
	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3425.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3425.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3425.49.10.25. SAMPLING TECHNICIANS

3425.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3425.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3425.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83

3425.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3425.55. QC & ANALYTICAL DATA VALIDATION									
3425.55. 5. DATA VALIDATION									
3425.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
3425.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
3425.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL 6TH YEAR O&M	12.00	MO	1,081,022	67,420	110,970	658,149	452,533	2,370,094	197507.84

3430. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430. 7TH YEAR O&M								
3430. 5. GENERAL CONDITIONS								
3430. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist III; Program Mgr.		103.40	0.00	0.00	0.00	0.00	103.40	
	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II; O&M Project Manager		72.60	0.00	0.00	0.00	0.00	72.60	
	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II Purchaser		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV; Regulatory Specialist		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
Assume one visit to site.								
USR AA Principal Engineer/Scientist III; Contractors CQC System Mana		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I - PCS Support		91.30	0.00	0.00	0.00	0.00	91.30	
	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

3430. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
3430. 5.15. SITE SECURITY								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE SECURITY	12.00 MO	0	0	0	131,400	0	131,400	10950.00
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	167,400	1,878	235,485	19623.73

3430.10. SITE FACILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.10. SITE FACILITIES									
USR AA Fax Machine			0.00	75.00	0.00	0.00	0.00	75.00	
	12.00	MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service			0.00	0.00	0.00	50.00	0.00	50.00	
	12.00	MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank			0.00	0.00	0.00	50.00	0.00	50.00	
	12.00	MO	0	0	0	600	0	600	50.00
USR AA Bottled Water			0.00	0.00	0.00	0.00	40.00	40.00	
	12.00	MO	0	0	0	0	480	480	40.00
USR AA Trash Removal			0.00	0.00	0.00	40.00	0.00	40.00	
	12.00	MO	0	0	0	480	0	480	40.00
USR AA Computer Rental			0.00	80.00	0.00	0.00	0.00	80.00	
	12.00	MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental			0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00	MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support			0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00	MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician			0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00	MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67

3430.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00

3430.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

3430.25. MAINTENANCE	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.25. MAINTENANCE									
USR AA PLC Support			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment			0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00	LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance			0.00	0.00	840.00	0.00	0.00	840.00	
	12.00	MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00

3430.30. UTILITIES	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.									
USR AA Telephone & Beepers			0.00	0.00	0.00	0.00	400.00	400.00	
	12.00	MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment			0.00	0.00	0.00	0.00	60.00	60.00	
	7008.00	KKW	0	0	0	0	420,480	420,480	60.00
Plant, Steam: $60 per K KWH									
USR AA Makeup Fresh Water, 750 Gal			0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	14016	UNT	0	0	0	0	11,213	11,213	0.80
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00	MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00	MO	0	0	0	0	438,869	438,869	36572.40

3430.35. SITE O&M LABOR & MISC EQUIPME	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.35. SITE O&M LABOR & MISC EQUIPMENT									
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00	HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV			43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00	HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV			61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00	HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57

3430.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	3500.00 LB	0	0	3,500	0	0	3,500	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	50000 LB	0	0	7,500	0	0	7,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	120000 LB	0	0	4,800	0	0	4,800	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	80000 LB	0	0	8,000	0	0	8,000	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	4000.00 LB	0	0	7,120	0	0	7,120	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	5000.00 LB	0	0	10,000	0	0	10,000	2.00
TOTAL CHEMICALS	12.00 MO	0	0	50,920	4,500	0	55,420	4618.33

3430.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.45. DISPOSALS								
3430.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	200.00 CY	0	0	0	8,000	0	8,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	300.00 TON	0	0	0	18,000	0	18,000	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	26,000	0	29,000	2416.67
3430.45.15. CARBON (GAC, LIQUID PHASE)								
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	3500.00 LBS	0	0	0	1,610	0	1,610	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	1,610	0	1,610	134.17
3430.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3430.45.25. OILY WASTE								
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	135714 GAL	0	0	0	268,714	0	268,714	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	268,714	0	268,714	22392.81
3430.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00

3430.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Additional Labor for Recurrin g			0.00	0.00	0.00	500.00	0.00	500.00	
Loadouts & Waste Handling	5.00	EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	300,824	0	317,034	26419.48

3430.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49. SAMPLING & ANALYSIS									
3430.49. 5. PERFORMANCE MONITORING									
3430.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	52.00	EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	52.00	EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)			0.00	0.00	304.16	0.00	0.00	304.16	
	14.00	EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)			0.00	0.00	0.00	55.00	0.00	55.00	
	58.00	EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
3430.49.10. COMPLIANCE MONITORING									
3430.49.10. 5. FUGITIVE EMISSIONS									
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Al low			0.00	5000.00	0.00	0.00	0.00	5000.00	
	5.00	EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.			0.00	0.00	925.00	0.00	0.00	925.00	
	4.00	EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses			0.00	0.00	200.00	0.00	0.00	200.00	
	1.00	LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags			0.00	0.00	200.00	0.00	0.00	200.00	
	12.00	MO	0	0	2,400	0	0	2,400	200.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
3430.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
3430.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

3430.49.10.25. SAMPLING TECHNICIANS

3430.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

3430.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
3430.49.15. CONFIRMATIONAL SAMPLING								
3430.49.15.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA NAPL Mobility		0.00	0.00	0.00	200.00	0.00	200.00	
	11.00 EA	0	0	0	2,200	0	2,200	200.00
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	11.00 EA	0	0	0	957	0	957	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	161.00	0.00	161.00	
	11.00 EA	0	0	0	1,771	0	1,771	161.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	180.00	0.00	180.00	
	11.00 EA	0	0	0	1,980	0	1,980	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geolog ist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car office.		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	5.00 DAY	0	0	0	0	990	990	198.00

3430.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	60,908	1,410	66,190	6619.00
3430.49.15.15. LIF SURVEY								
USR AA LIF Survey/Report		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL LIF SURVEY		0	0	0	5,000	0	5,000	
TOTAL CONFIRMATIONAL SAMPLING		3,872	0	0	65,908	1,410	71,190	
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	21,640	184,043	10,316	278,980	23248.33

3430.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.55. QC & ANALYTICAL DATA VALIDATION								
3430.55. 5. DATA VALIDATION								
3430.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
3430.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
3430.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	14,256	0	0	0	0	14,256	1188.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60. DEMO/REMOVAL TREATMENT SYSTEM									
3430.60.02. GENERAL CONDITIONS									
3430.60.02.01. FIELD SUPERVISION & MANAGEMENT									
Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.									
USR AA Prin. Engineer/Scientist I,			66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	200.00	HR	13,363	0	0	0	0	13,363	66.82
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	1000.00	HR	53,130	0	0	0	0	53,130	53.13
USR AA Secretary/Clerical II			19.32	0.00	0.00	0.00	0.00	19.32	
	1000.00	HR	19,320	0	0	0	0	19,320	19.32
USR AA Health & Safety Officer (HSO)			37.03	0.00	0.00	0.00	0.00	37.03	
	1000.00	HR	37,030	0	0	0	0	37,030	37.03
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P			0.00	5.50	0.00	0.00	0.00	5.50	
KUP	2000.00	HR	0	11,000	0	0	0	11,000	5.50
REF. EP 1110-1-8 4X2 3/4-TON									
USR AA Lodging;			0.00	0.00	0.00	0.00	1000.00	1000.00	
	6.00	MO	0	0	0	0	6,000	6,000	1000.00
USR AA M&IE			0.00	0.00	0.00	0.00	28.50	28.50	
	260.00	DAY	0	0	0	0	7,410	7,410	28.50
USR AA Airfare			0.00	0.00	0.00	0.00	500.00	500.00	
	12.00	EA	0	0	0	0	6,000	6,000	500.00
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	12.00	EA	0	0	0	0	240	240	20.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	10000	MI	0	0	0	0	3,500	3,500	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	122,843	11,000	0	0	23,150	156,993	156993.00
3430.60.02.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	40.00	HR	4,136	0	0	0	0	4,136	103.40

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Prin. Engineer/Scientist I;			91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	200.00	HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	400.00	HR	15,400	0	0	0	0	15,400	38.50
USR AA Engineer/Scientist IV -			59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	520.00	HR	30,888	0	0	0	0	30,888	59.40
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	40.00	HR	4,136	0	0	0	0	4,136	103.40
Health and Safety Manager									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	40.00	HR	4,136	0	0	0	0	4,136	103.40
gr									
USR AA Mileage on Personal Car Pjm			0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	10000	MI	0	0	0	0	3,100	3,100	0.31
s*									
USR AA Lodging; three mo for PjM plu			0.00	0.00	0.00	0.00	80.00	80.00	
s	10.00	DAY	0	0	0	0	800	800	80.00
additional visits during									
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	10.00	DAY	0	0	0	0	380	380	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	2.00	EA	0	0	0	0	1,000	1,000	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	6.00	DAY	0	0	0	0	270	270	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	6.00	EA	0	0	0	0	120	120	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	76,956	0	0	0	5,670	82,626	82626.00
3430.60.02.03. PURCHASING									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Secretary/Clerical IV Home			38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	16.00	HR	616	0	0	0	0	616	38.50

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PURCHASING	1.00	JOB	3,520	0	0	0	0	3,520	3520.00
3430.60.02.06. FIRST AID, FIRE, TRAFFIC, SECUR									
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S			56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00	EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower			145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00	EA	145	1	123	0	0	269	269.19
HTW AA Eye Wash Bowl			126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	4.00	EA	508	4	661	0	0	1,173	293.21
HTW AA First Aid Kit			0.00	0.00	75.00	0.00	0.00	75.00	
	16.00	EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher			0.00	0.00	150.00	0.00	0.00	150.00	
	2.00	EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00	JOB	1,773	15	3,458	0	0	5,247	5246.78
3430.60.02.07. HEALTH & SAFETY									
USR AA Decon Misc Items			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
USR AA Level C PPE			0.00	0.00	41.00	0.00	0.00	41.00	
	40.00	DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE			0.00	0.00	12.00	0.00	0.00	12.00	
	520.00	DAY	0	0	6,240	0	0	6,240	12.00
USR AA Install/Decon Personnel Decon			192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00	LS	192	1	250	0	0	443	443.30
USR AA Photo Ionization Detector			0.00	800.00	0.00	0.00	0.00	800.00	
	6.00	MO	0	4,800	0	0	0	4,800	800.00
USR AA Calibration Gasses			0.00	0.00	550.00	0.00	0.00	550.00	
	1.00	LS	0	0	550	0	0	550	550.00
USR AA LEL			0.00	350.00	0.00	0.00	0.00	350.00	
	6.00	MO	0	2,100	0	0	0	2,100	350.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	6.00 MO	0	2,550	0	0	0	2,550	425.00
USR AA Labor Allowance for Site Specific Training		120.00	0.00	0.00	0.00	0.00	120.00	
	10.00 EA	1,200	0	0	0	0	1,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	10.00 EA	2,000	0	0	0	0	2,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	10.00 EA	0	0	0	3,500	0	3,500	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	3,392	9,451	9,180	3,500	0	25,523	25523.30
3430.60.02.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	6.00 MO	0	0	0	0	450	450	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	6.00 MO	0	0	0	0	2,400	2,400	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	12.00 MO	0	0	0	0	1,020	1,020	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	6.00 MO	0	0	2,400	0	0	2,400	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	6.00 MO	0	3,600	0	0	0	3,600	600.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	6.00 MO	0	600	0	0	0	600	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	6.00 MO	0	0	0	0	300	300	50.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	1.00 EA	0	3,000	0	0	0	3,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	1.00 EA	0	2,000	0	0	0	2,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	1.00 EA	0	100	0	0	0	100	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	1.00 EA	0	0	0	600	0	600	600.00
USR AA Small Tool Allowance		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Water Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	9,300	4,700	4,500	6,570	25,070	25070.00
3430.60.02.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	300.00	300.00	
	6.00 MO	0	0	0	0	1,800	1,800	300.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	6.00 MO	0	0	0	0	2,700	2,700	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	6.00 MO	0	0	0	600	1	601	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	600	4,501	5,101	5100.60
TOTAL GENERAL CONDITIONS	1.00 JOB	208,485	29,766	17,338	8,600	39,891	304,080	304079.67

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3430.60.05. DEMO GWTP									
L UPB AA CRANE,HYD,S/P,RT,4WD,40T/84'B			56.51	116.82	0.00	0.00	0.00	173.32	
OOM	160.00	HR	9,041	18,691	0	0	0	27,732	173.32
CIV AA Demo Welded Steel Pipe, 4" Di			7.63	1.07	0.00	0.00	0.00	8.70	
a	2000.00	LF	15,259	2,132	0	0	0	17,391	8.70
CIV AA Demo Welded St Pipe 6" to 12"			14.17	1.98	0.00	0.00	0.00	16.15	
Dia	400.00	LF	5,668	792	0	0	0	6,459	16.15
L AIR AA Structure Demo			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
L AIR AA Equipment Demo/Removal			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
TOTAL DEMO GWTP	1.00	JOB	50,760	34,260	0	0	0	85,020	85019.86
3430.60.10. DEMO PIPING									
L CIV AA Demo Welded Steel Pipe, 4" Di			2.48	0.35	0.00	0.00	0.00	2.83	
a	31320	LF	77,661	10,849	0	0	0	88,510	2.83
L CIV AA Demo Welded St Pipe 6" to 12"			6.20	0.87	0.00	0.00	0.00	7.06	
Dia	4000.00	LF	24,796	3,464	0	0	0	28,260	7.06
TOTAL DEMO PIPING	1.00	JOB	102,457	14,313	0	0	0	116,770	116769.92
3430.60.15. PLUG & ABANDON WELLS									
USR AA Plug and Abandon Injection &			0.00	0.00	0.00	6.00	0.00	6.00	
Extraction Wells	36851	LFT	0	0	0	221,106	0	221,106	6.00
USR AA Plug & Abandon VEA & DPT at			0.00	0.00	0.00	100.00	0.00	100.00	
Surface	400.00	EA	0	0	0	40,000	0	40,000	100.00
TOTAL PLUG & ABANDON WELLS	1.00	JOB	0	0	0	261,106	0	261,106	261106.00
3430.60.20. DISPOSALS									
USR AA Transportation & Disposal at			0.00	0.00	0.00	200.00	0.00	200.00	
RCRA Landfill (Non-Hazardous)	2000.00	TON	0	0	0	400,000	0	400,000	200.00

3430.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Transportation & Disposal -			0.00	0.00	0.00	1000.00	0.00	1000.00	
Hazardous	200.00	TON	0	0	0	200,000	0	200,000	1000.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	600,000	0	600,000	600000.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	361,701	78,339	17,338	869,706	39,891	1,366,975	113914.62
TOTAL 7TH YEAR O&M	12.00	MO	1,446,596	145,759	124,808	1,592,153	493,833	3,803,150	316929.13

3435. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435. 8TH YEAR O&M								
3435. 5. GENERAL CONDITIONS								
3435. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	8.00 HR	827	0	0	0	0	827	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	4.00 HR	290	0	0	0	0	290	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	4.00 HR	339	0	0	0	0	339	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00 HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	4.00 HR	414	0	0	0	0	414	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	2.00 HR	207	0	0	0	0	207	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	400.00 MI	0	0	0	0	124	124	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	2.00 DAY	0	0	0	0	84	84	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	2.00 EA	0	0	0	0	20	20	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00

3435. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00	MO	5,711	0	0	0	318	6,029	502.43
TOTAL GENERAL CONDITIONS	12.00	MO	5,711	0	0	0	318	6,029	502.43

3435.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.49. SAMPLING & ANALYSIS								
3435.49.10. COMPLIANCE MONITORING								
3435.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	138.00 EA	0	0	0	19,320	0	19,320	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	138.00 EA	0	0	0	21,390	0	21,390	155.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	18.00 EA	0	0	1,782	0	0	1,782	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	18.00 EA	0	0	90	0	0	90	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	1,912	40,710	0	42,622	3551.86
3435.49.10.25. SAMPLING TECHNICIANS								
3435.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00

3435.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING GW WELLS	4.00	QTR	14,784	0	1,000	0	6,906	22,690	5672.50
3435.49.10.25.10. GW MONITORING REPORT									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	160.00	HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	32.00	HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	0	2,912	40,910	8,906	86,837	7236.43

3435.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3435.55. QC & ANALYTICAL DATA VALIDATION									
3435.55. 5. DATA VALIDATION									
3435.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL MONITORING WELL SAMPLES	1.00	YR	2,376	0	0	0	0	2,376	2376.00
TOTAL DATA VALIDATION	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL 8TH YEAR O&M	12.00	MO	42,196	0	2,912	40,910	9,224	95,242	7936.86
TOTAL McCORMICK&BAXTER SUPERFUND SI	1.00	EA	14979717	824,082	11702770	19675456	33637545	80,819,571	80819570.83

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	AASBC	2 B-asbtswkr + Small Tools			PROD = 100%				CREW HOURS =	1956
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
MIL	B-ASBTSWKRF	Asbestos Workers	0.50	HR	62.89	0.50	31.44			31.44
MIL	XMIXX020 E	Small Tools	0.68	HR	1.57			0.68	1.07	1.07
	TOTAL					2.50	156.22	0.68	1.07	157.29
	AASBG	3 B-asbtswkr + 1 Flatbed Truck			PROD = 100%				CREW HOURS =	1
MIL	XMIXX010 E	Misc. Power Tools	0.50	HR	6.40			0.50	3.20	3.20
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50F0011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	B-ASBTSWKRF	Asbestos Workers	1.00	HR	62.89	1.00	62.89			62.89
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
	TOTAL					3.00	187.66	3.50	19.73	207.39
	ACARA	1 B-carpnter + Small Tools			PROD = 100%				CREW HOURS =	40
MIL	B-CARPNTERL	Carpenters	1.00	HR	44.71	1.00	44.71			44.71
MIL	B-CARPNTERF	Carpenters	0.25	HR	45.21	0.25	11.30			11.30
MIL	XMIXX020 E	Small Tools	0.31	HR	1.57			0.31	0.49	0.49
	TOTAL					1.25	56.01	0.31	0.49	56.50
	CLACC	3 B-laborer + 1 Hand Compaction Rammer			PROD = 100%				CREW HOURS =	29
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	C10WC003 E	COMPACTOR, RAMMER, 13"X11" SHOE	1.00	HR	2.33			1.00	2.33	2.33
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					3.00	115.67	1.23	2.69	118.36
	CODEA	1 B-eqoprcrn + 1 1 Cy Hydr. Excavator			PROD = 100%				CREW HOURS =	17
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	H25CA004 E	HYD EXCAV,CRWLR, 1.00CY BKT,LON	1.00	HR	42.66			1.00	42.66	42.66
MIL	XMIXX020 E	Small Tools	0.11	HR	1.57			0.11	0.17	0.17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	97.06	1.11	42.83	139.89
	CODEJ	2 B-laborer + 1 Loader/Backhoe			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	L50CA003 E	LDR,BK,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.13	HR	1.57			0.13	0.20	0.20
	TOTAL					3.25	143.01	1.13	18.19	161.20

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	CODEP	4 B-plumber + 1 1.5 Cy Hydr. Excavator, Cwlr			PROD = 100%				CREW HOURS =	57
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	2.00	HR	50.69	2.00	101.38			101.38
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER F	Plumbers	1.00	HR	51.19	1.00	51.19			51.19
MIL	H25CA016 E	HYD EXCAV, CRWLR, 1.50 CY BKT	1.00	HR	61.83			1.00	61.83	61.83
MIL	XMIXX020 E	Small Tools	1.02	HR	1.57			1.02	1.60	1.60
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					6.00	292.07	3.02	69.91	361.98
	CODLB	1 B-eqoprmed + 1 1.5 Cy Front End Ldr, Cwlr			PROD = 100%				CREW HOURS =	17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50	HR	38.39	0.50	19.19			19.19
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
	TOTAL					1.50	76.20	1.00	32.06	108.26
	CODTK	1 B-eqoprmed + 1 Dozer/Roller, Cat D-8L, 335 Hp			PROD = 100%				CREW HOURS =	233
MIL	B-EQOPRCRNF	Equip. Operators, Crane/Shovel	0.25	HR	59.17	0.25	14.79			14.79
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	R40S0001 E	ROLLR,VIB,SD,TOW,SHPF,25.5T,72"	1.00	HR	25.53			1.00	25.53	25.53
MIL	T10CA017 E	BLADE, UNIVERSAL, HYDR (FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
	TOTAL					1.25	73.46	3.00	121.45	194.91
	COETF	2 B-laborer + 1 8 Cy Dump Truck,Bckhoe/Loadr			PROD = 100%				CREW HOURS =	6
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.37	HR	1.57			0.37	0.58	0.58
MIL	T40XX008 E	REAR DUMP BODY, 8 CY,(30,000 GV	1.00	HR	2.75			1.00	2.75	2.75
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
	TOTAL					4.00	177.65	3.37	54.97	232.62
	COETL	3 B-laborer + 2 12 Cy Dump Trck/CrawlrLoadr			PROD = 100%				CREW HOURS =	80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	2.00	HR	43.87	2.00	87.73			87.73
MIL	L35CA007 E	LDR,FE, CRWLR, 3.75 CY	1.00	HR	84.68			1.00	84.68	84.68
MIL	XMIXX020 E	Small Tools	0.28	HR	1.57			0.28	0.44	0.44
MIL	T40XX010 E	REAR DUMP BODY,12 CY,(36,000 GV	2.00	HR	2.82			2.00	5.63	5.63
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	2.00	HR	33.66			2.00	67.31	67.31
	TOTAL					6.00	259.91	5.28	158.06	417.97

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	COFGA	1 B-eqoprmed + 1 Grader 12-G			PROD = 100%				CREW HOURS =	13
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
	TOTAL					2.00	95.40	1.00	33.04	128.44
	COKBD	2 B-laborer + 1 Bitum.Dist.Truck/Sweepr			PROD = 100%				CREW HOURS =	1
MIL	A25RS007 E	ASPH DISTR, 3000 GAL, (ADD TR	1.00	HR	15.33			1.00	15.33	15.33
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-TRKDVRLTL	Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	B15MB004 E	STR SWEEPER, 7'W/SPRINKER, TOWE	1.00	HR	4.05			1.00	4.05	4.05
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
	TOTAL					4.00	163.13	4.00	67.28	230.41
	COMCE	Dozer D6 + Dozer D8 + Ripper + Truck			PROD = 100%				CREW HOURS =	30
MIL	B20VE001 E	BRUSH CHIPPER, 6" DIA. LOG, TRL	2.00	HR	15.44			2.00	30.89	30.89
MIL	L10BS002 E	MULTIAPPLIC RAKE FOR D8L TRACTO	2.00	HR	4.98			2.00	9.96	9.96
MIL	R10CA011 E	RIPPER,SING-SHNK BEAM, HYD, D-8	1.00	HR	8.33			1.00	8.33	8.33
MIL	R10CA013 E	RIPPER, SHANKS EA, D-8	1.00	HR	0.72			1.00	0.72	0.72
MIL	T10CA010 E	BLADE, ANGLE, HYDR, FOR D6	1.00	HR	4.32			1.00	4.32	4.32
MIL	T10CA011 E	WINCH,(W/O CABLE),FOR D6 TRACTO	1.00	HR	5.55			1.00	5.55	5.55
MIL	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA008 E	DOZER,CWLR,D-6D,PS,(ADD BLADE)	1.00	HR	35.45			1.00	35.45	35.45
MIL	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T50FO004 E	TRK,HWY,4X4,F250,3/4T,8800 GVW	1.00	HR	8.70			1.00	8.70	8.70
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	B-EQOPRLT L	Eq Oper, Light	2.00	HR	54.50	2.00	108.99			108.99
MIL	B-EQOPRMEDL	Eq Oper, Medium	2.00	HR	56.51	2.00	113.01			113.01
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	38.39	4.00	153.56			153.56
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
	TOTAL					9.00	414.45	14.00	202.98	617.43
	EELEB	2 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	3269
MIL	B-ELECTRN F	Electricians	0.50	HR	36.43	0.50	18.21			18.21
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					2.50	90.07	0.23	0.36	90.43
	EELEF	4 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	500
MIL	B-ELECTRN F	Electricians	0.66	HR	36.43	0.66	24.04			24.04
MIL	B-ELECTRN A	Electricians	2.00	HR	29.72	2.00	59.44			59.44
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.45	HR	1.57			0.45	0.71	0.71
	TOTAL					4.66	155.34	0.45	0.71	156.04

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MPLUA	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS = 1234	
MIL	B-PLUMBER F	Plumbers	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	XMIXX020 E	Small Tools	0.34	HR	1.57			0.34	0.53	0.53
	TOTAL					1.25	63.49	0.34	0.53	64.02
	MPLUC	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS = 98	
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.10	HR	51.19	0.10	5.12			5.12
MIL	XMIXX020 E	Small Tools	0.19	HR	1.57			0.19	0.30	0.30
	TOTAL					1.10	55.81	0.19	0.30	56.11
	MPLUE	1 B-plumber/laborer + Small Tools			PROD = 100%				CREW HOURS = 1843	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.67	HR	1.57			0.67	1.05	1.05
	TOTAL					2.50	114.67	0.67	1.05	115.72
	MPLUJ	2 B-plumber + Small Tools			PROD = 100%				CREW HOURS = 811	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
	TOTAL					3.50	157.12	1.01	1.59	158.70
	MPLUK	2 B-plumber + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS = 604	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					3.50	157.12	2.01	3.23	160.35
	MSPFA	1 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS = 3250	
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	XMIXX020 E	Small Tools	0.36	HR	1.57			0.36	0.57	0.57
	TOTAL					1.25	63.49	0.36	0.57	64.05

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MSPFB	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	3075
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFD	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	96
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFE	2 B-stm/pipe + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	8869
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					2.50	118.73	1.72	2.78	121.50
	MSPFH	2 B-stm/pipe + 1 200 Amp Welding Machine			PROD = 100%				CREW HOURS =	421
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	XMIXX020 E	Small Tools	0.82	HR	1.57			0.82	1.29	1.29
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					3.25	144.32	1.82	7.77	152.09
	ULABB	2 B-laborer + Small Tools			PROD = 100%				CREW HOURS =	129
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50	HR	38.89	0.50	19.44			19.44
MIL	XMIXX020 E	Small Tools	0.27	HR	1.57			0.27	0.42	0.42
	TOTAL					2.50	96.22	0.27	0.42	96.65
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS =	52
MIL	A30BG003 E	ASPH FINISHER, 10'W/SCREED,PNEU	1.00	HR	57.79			1.00	57.79	57.79
MIL	B15MB002 E	STR SWEEPER, 7'W/SPRINKER	1.00	HR	1.64			1.00	1.64	1.64
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	R30IG008 E	ROLLER,STATIC,3WHL,S/P, 12T,84"	2.00	HR	16.60			2.00	33.20	33.20
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	**** LABOR **** COST	**** EQUIP **** HOURS	**** EQUIP **** COST	TOTAL COST
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	7.00	HR	38.39	7.00	268.73			268.73
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	3.00	HR	56.51	3.00	169.52			169.52
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRHVL	Outside Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
	TOTAL					12.00	539.12	10.00	140.56	679.68
	XLABB	2 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	99
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					2.34	90.00	1.00	1.57	91.57
	XLABC	3 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	6
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					3.34	128.39	1.00	1.57	129.96
	XPLUC	1 X-plumber + Small Tools			PROD = 100%				CREW HOURS =	12
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-PLUMBER F	Outside Plumbers	0.17	HR	51.19	0.17	8.70			8.70
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					3.17	136.17	1.00	1.57	137.74
	XSABA	3 X-eqoprmed + 1 Grader, 2 Rollers, 3 Trucks			PROD = 100%				CREW HOURS =	3
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	2.00	HR	42.48	2.00	84.96			84.96
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	T60KI002 E	TRK,WTR,OF-HY, 6000GAL,W/CAT621	1.00	HR	61.65			1.00	61.65	61.65
MIL	A10ET001 E	CHIPSPREADER,S/P, 10'W, MECH	1.00	HR	18.31			1.00	18.31	18.31
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T10CA016 E	BLADE, STRAIGHT, HYDR (FOR D8	1.00	HR	7.45			1.00	7.45	7.45
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
	TOTAL					8.00	370.15	6.00	240.47	610.62
	XSGRA	3 X-eqoprmed + 1 Shpf Roller,Grader,Water Truck			PROD = 100%				CREW HOURS =	25
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRK	1.00	HR	3.40			1.00	3.40	3.40
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
	TOTAL					6.00	289.28	6.00	88.82	378.09
	XXPLA	3 X-laborer + 1 20 Ton Crane, Hydraulic R/T			PROD = 100%				CREW HOURS =	498
MIL	C75GV002 E	CRANE,HYD,S/P,RT,4WD,20T/70'BOO	1.00	HR	33.07			1.00	33.07	33.07
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
MIL	X-PLUMBER F	Outside Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					5.50	247.96	2.00	34.64	282.60
	XXQOK	1 X-eqoprhvy + 1 25 Ton Shear/Hydr. Excavator			PROD = 100%				CREW HOURS =	160
MIL	H25CA007 E	HYD EXCAV, CRWLR, 2.00 CY BKT	1.00	HR	88.70			1.00	88.70	88.70
MIL	H25LU009 E	SHEAR,32"OPEN,32"THROAT, 9'0"RC	1.00	HR	28.11			1.00	28.11	28.11
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
	TOTAL					1.00	56.51	2.00	116.82	173.32

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	A-1E/S III	Engineer/Scientist III	23.00	0.0%	61.0%	0.00	0.00	37.03	HR	06/05/01	0.00	4400
USR	A-1E/S IV	Engineer/Scientist IV	27.00	0.0%	61.0%	0.00	0.00	43.47	HR	06/05/01	0.00	68360
USR	A-1PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	61.0%	0.00	0.00	66.82	HR	06/05/01	0.00	3600
USR	A-1S/C II	Secretary/Clerical II	12.00	0.0%	61.0%	0.00	0.00	19.32	HR	06/05/01	0.00	4400
USR	A-1SE/SII	Senior Engineer/Scientist II	33.00	0.0%	61.0%	0.00	0.00	53.13	HR	06/05/01	0.00	66266
USR	A-1SE/SIV	Senior Engineer/SScientist IV	38.50	0.0%	61.0%	0.00	0.00	61.99	HR	06/05/01	0.00	14568
USR	A-1T- VI	Technician VI	22.00	0.0%	61.0%	0.00	0.00	35.42	HR	06/05/01	0.00	20
USR	A2-E/SII	Engineer/Scientist II	19.00	0.0%	120.0%	0.00	0.00	41.80	HR	06/05/01	0.00	3900
USR	A2-E/SIII	Engineer/Scientist III	23.00	0.0%	120.0%	0.00	0.00	50.60	HR	06/05/01	0.00	80
USR	A2-E/SIV	Engineer/Scientist IV	27.00	0.0%	120.0%	0.00	0.00	59.40	HR	06/05/01	0.00	10497
USR	A2-PE/SI	Prin. Engineer/Scientist I	41.50	0.0%	120.0%	0.00	0.00	91.30	HR	06/05/01	0.00	3064
USR	A2-PE/SIII	Prin. Engineer/Scientist III	47.00	0.0%	120.0%	0.00	0.00	103.40	HR	06/05/01	0.00	3439
USR	A2-S/CIV	Secretary/Clerical IV	17.50	0.0%	120.0%	0.00	0.00	38.50	HR	06/05/01	0.00	3610
USR	A2-SE/SI	Senior Engineer/Scientist I	30.50	0.0%	120.0%	0.00	0.00	67.10	HR	06/05/01	0.00	3020
USR	A2-SE/SII	Senior Engineer/Scientist II	33.00	0.0%	120.0%	0.00	0.00	72.60	HR	06/05/01	0.00	9436
USR	A2-SE/SIII	Senior Engineer/Scientist III	36.00	0.0%	120.0%	0.00	0.00	79.20	HR	06/05/01	0.00	240
USR	A2-SE/SIV	Senior Engineer/Scientist IV	38.50	0.0%	120.0%	0.00	0.00	84.70	HR	06/05/01	0.00	3586
USR	A2-T/AIV	Technician IV	15.00	0.0%	120.0%	0.00	0.00	33.00	HR	06/05/01	0.00	2326
USR	A2-T/AVI	Technician VI	22.00	0.0%	120.0%	0.00	0.00	48.40	HR	06/05/01	0.00	2064
MIL	B-ASBTSWKR	Asbestos Workers	38.50	0.0%	41.4%	7.93	0.00	62.39	HR	06/05/01	25.09	4894
MIL	B-CARPNTER	Carpenters	23.45	0.0%	41.4%	11.54	0.00	44.71	HR	06/05/01	22.87	50
MIL	B-ELECTRN	Electricians	21.95	0.0%	41.5%	4.88	0.00	35.93	HR	06/05/01	27.92	10583
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	32.23	0.0%	41.4%	13.0%	0.00	58.67	HR	06/05/01	23.41	366
MIL	B-EQOPRLT	Equip. Operators, Light	29.28	0.0%	41.5%	13.0%	0.00	54.50	HR	06/05/01	15.97	60
MIL	B-EQOPRMED	Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	15.97	507
MIL	B-LABORER	Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	12.50	5574
MIL	B-PLUMBER	Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	22.98	8182
MIL	B-STM/PIPE	Steam / Pipefitters	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	27.95	35108
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	11.56	168
MIL	B-TRKDVRLT	Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	9.51	1
MIL	X-EQOPRMED	Outside Equip. Operators, Medium	30.70	0.0%	41.5%	13.0%	0.00	56.51	HR	06/05/01	21.21	1029
MIL	X-LABORER	Outside Laborers, (Semi-Skilled)	21.64	0.0%	41.5%	7.78	0.00	38.39	HR	06/05/01	9.72	2623
MIL	X-PLUMBER	Outside Plumbers	29.14	0.0%	41.4%	9.47	0.00	50.69	HR	06/05/01	20.49	4241
MIL	X-TRKDVRHV	Outside Truck Drivers, Heavy	22.67	0.0%	41.4%	11.80	0.00	43.87	HR	06/05/01	19.23	52
MIL	X-TRKDVRLT	Outside Truck Drivers, Light	21.69	0.0%	41.4%	11.80	0.00	42.48	HR	06/05/01	17.09	31

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	TOTAL ** HOURS
UPB	A10ET001	CHIPSPREADER,S/P, 10'W, MECH	5.67	1.96	3.75	0.93	0.26	0.04	5.70	18.31 HR	3
UPB	A25RS007	ASPH DISTR, 3000 GAL	3.98	1.10	4.32	1.42			4.51	15.33 HR	1
UPB	A30BG003	ASPH FINISHER, 10'W/SCREED,PNEUM	18.65	6.46	4.91	1.42	1.16	0.18	25.01	57.79 HR	52
UPB	B15MB002	STR SWEEPER, 7'W/SPRINKER	0.64	0.18		0.14			0.69	1.64 HR	52
UPB	B15MB004	STR SWEEPER, 7'W/SPRINKER, TOWED	0.86	0.25	1.56	0.38	0.05	0.01	0.94	4.05 HR	1
MIL	B20VE001	B-CHIPPER, 6" DIA LOG, TRLR-MTD	1.61	0.45	8.56	2.82	0.04	0.01	1.96	15.44 HR	60
MIL	C10WC003	COMPACTOR, RAMMER, 11"X13" SHOE	0.62	0.11	0.48	0.12			1.00	2.33 HR	29
MIL	C75GV002	CRANE,HYD,S/P,RT,4WD,20T/70'BOOM	10.81	4.66	3.88	1.20	1.14	0.18	11.20	33.07 HR	498
MIL	C80PA003	CRANE,HYD,TRK MTD, 4.5T/52'BOOM	1.95	0.81		0.10			1.51	4.37 HR	80
UPB	F10CA024	FORK LIFT,R/T 8,000#,16.00'L-HT	3.62	1.31	2.15	0.53	0.52	0.08	3.72	11.94 HR	240
UPB	G15CA003	GRADER,MOTOR, ARTIC, CAT 12-G	10.86	4.86	3.92	1.37	0.55	0.09	11.39	33.04 HR	41
MIL	H25CA004	HYD EXCAV,CRWLR, 1.00CY BKT,LONG	15.83	4.80	3.63	1.42			16.98	42.66 HR	17
UPB	H25CA007	HYD EXCAV, CRWLR, 2.00 CY BKT	31.61	10.66	7.26	2.84			36.33	88.70 HR	160
UPB	H25CA016	HYD EXCAV, CRWLR, 1.50 CY BKT	22.50	6.83	6.01	2.35			24.14	61.83 HR	57
UPB	H25LU009	SHEAR,32"OPEN,32"THROAT, 9'0"RCH	11.27	2.23		1.70			12.92	28.11 HR	160
MIL	L10BS002	MULTI-APPLICATION RAKE, 12.5W 9T	1.82	0.50		0.30			2.35	4.98 HR	60
UPB	L35CA004	LDR,FE, CRWLR, 1.50 CY	8.68	2.93	2.75	1.07			16.64	32.06 HR	20
UPB	L35CA007	LDR,FE, CRWLR, 3.75 CY	22.94	7.73	7.21	2.82			43.98	84.68 HR	80
MIL	L40CA001	LDR,FE, WH, 1.25 CY, ARTIC, 910E	5.79	2.23	2.06	0.89	0.83	0.13	6.01	17.93 HR	120
UPB	L50CA003	LDR,BH,WH, 1.38CY FE BKT, 30"DIP	5.53	2.11	2.44	0.80	0.48	0.07	6.55	17.99 HR	17
UPB	R10CA011	RIPPER, 1-SHANK BEAM,HYD, D-8	3.21	0.89		0.10			4.14	8.33 HR	30
UPB	R10CA013	RIPPER, SHANKS EACH, D-8	0.28	0.08					0.36	0.72 HR	30
UPB	R30CA001	ROLLR,STATIC,S/P,13T,84"W,11TIRE	5.11	1.54	2.44	0.60	0.98	0.15	4.75	15.58 HR	77
UPB	T10CA010	BLADE, ANGLE, HYDR, D-6	1.71	0.58		0.08			1.96	4.32 HR	30
MIL	T10CA011	WINCH, (ADD CABLE), D-6	2.20	0.74		0.08			2.53	5.55 HR	30
UPB	T10CA016	BLADE, STRAIGHT, HYDR, D-8	2.95	0.99		0.12			3.38	7.45 HR	3
UPB	T10CA017	BLADE, UNIVERSAL, HYDR, D-8	3.15	1.06		0.13			3.61	7.95 HR	263
MIL	T15CA008	DOZER,CWLR, D-6D,PS	9.01	3.34	4.80	1.78			16.52	35.45 HR	30
MIL	T15CA015	DOZER,CWLR, D-8L,PS	26.41	8.90	11.50	3.32			37.85	87.97 HR	266
MIL	T30DW001	TRENCHR,CHN, 24"DP,6"W,WLK-BEHND	0.41	0.12	0.78	0.22	0.04	0.01	0.51	2.08 HR	32
UPB	T40XX008	REAR DUMP BODY, 8.0CY	1.20	0.33		0.09			1.13	2.75 HR	6
UPB	T40XX010	REAR DUMP BODY, 12.0CY	1.23	0.34		0.09			1.16	2.82 HR	160
MIL	T40XX016	FLATBED, 8'x 16.0'	0.34	0.09					0.27	0.71 HR	53
UPB	T40XX033	WATER TANK, 3000 GAL	1.63	0.45					1.32	3.40 HR	25
MIL	T50FO002	TRK,HWY, 6,250GVW,4X4, 1/2T-PKUP	1.75	0.49	2.41	0.70	0.22	0.03	1.91	7.52 HR	640
UPB	T50FO004	TRK,HWY, 8,800GVW,4X4, 3/4T-PKUP	2.03	0.56	2.83	0.82	0.23	0.03	2.21	8.70 HR	30
UPB	T50FO011	TRK,HWY, 24,700 GVW, 4X2, 2 AXLE	2.87	0.97	4.94	1.32	1.03	0.16	2.96	14.25 HR	106
MIL	T50KE003	TRK,HWY, 46,000 GVW, 6X4, 3 AXLE	9.42	2.64	9.46	2.73	0.44	0.07	8.89	33.66 HR	193
UPB	T60KI002	TRK,WTR,OF-HY, 6000GAL,W/CAT621E	18.15	7.76	10.45	3.45	4.07	0.63	17.13	61.65 HR	3
UPB	W35XX002	WELDER, 200 AMP, W/1 AXLE TRLR	0.49	0.17	4.18	1.03	0.03	0.01	0.57	6.48 HR	478
UPB	W35XX009	WELDER, 300 AMP, SKID,ELEC DRIVE	0.37	0.09	0.66	0.27			0.26	1.65 HR	9473
UPB	XMIXX010	MISC. POWER TOOLS	2.17	0.76	0.60	0.27			2.60	6.40 HR	1
UPB	XMIXX020	SMALL TOOLS	0.50	0.22	0.16	0.07			0.63	1.57 HR	16563

McCORMICK & BAXTER SUPERFUND SITE

6/5/01

ASSUMED MARKUPS ON LABOR FOR ESTIMATE

	FICA	FUTA	SUI	WC	BENEFITS	OH	TOTAL
OFFICE STAFF (MANAGERS, ENGINEERS, CLERICAL)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	**120.00%**
FIELD STAFF (ENGINEERS, MANAGERS, TECHNICIANS)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	**61.00%**
CRAFT LABOR	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	**41.45%**

NOTES:

1 Workmans Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction.
Workmans Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group

2 Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group.
Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.

3 Overhead rates for craft labor are based on RS Means averages for larger construction companies.
Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resourses), training, medical surveillance, and other costs directly associated with craft labor.
Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group.
Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office.
Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).

4 State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

** PROJECT SETTINGS **

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 0.0%

DATE OF ESCALATION SCHEDULE : 07/13/01

PROJECT DIRECT COST COLUMNS

Col Type	L	E	M	U	U
Rep Width	10	10	10	10	10
Title	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER

PROJECT INDIRECT COST COLUMNS

Col Type	U	P	B	X	X
Rep Width	10	10	10	0	0
Title	G&A	PROFIT	BOND	<Unused>	<Unused>

PROJECT OWNER COST COLUMNS

Col Type	U	U	X	X	X
Rep Width	10	10	0	0	0
Title	SCP CONT	BID CONT	<Unused>	<Unused>	<Unused>

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	5	.	ACCOUNT	0
Level 2 ID :	2	.	SYSTEM	0
Level 3 ID :	2	.	SUBSYSTM	0
Level 4 ID :	2	.	ASSY CAT	0
Level 5 ID :	2	.	ASSEMBLY	0
Level 6 ID :	2	.	LEVEL 6	0

Owner Cost Level : 2

** PROJECT SETTINGS **

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)
Shadow	X	X	X	X	X

DETAIL REPORT FORMATTING

PAGE OPTIONS
Page Break Levels : 2
Table of Contents Levels : 4

		0	1	2	3	4	5	6	7
ROW OPTIONS	Print Titles at Levels :		Y	Y	Y	Y	Y	Y	
	Print Totals at Levels :		Y	Y	Y	Y	Y	Y	
	Print Notes at Levels :	Y	Y	Y	Y	Y	Y	Y	Y
	Print Unit Cost Row :	Y							
	Print Page Footer :	N							
	Show Cost Codes :	Y							
COLUMNS OPTIONS	Print Crew Id :	N							
	Crew Output :	N							
	Unit Cost :	Y							
UPB TITLES	No. of Levels to Print :	0							
	Bracket Titles With :	< >							
	Include titles Notes :	Y							

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 G&A : G&A; 6%
Column 2 PROFIT : PROFIT; 10%
Column 3 BOND : BOND; 0.5%
Column 4 <Unused> :
Column 5 <Unused> :

Column 1 SCP CONT : Scope Contingency
Column 2 BID CONT : Bid Contingency
Column 3 <Unused> :
Column 4 <Unused> :
Column 5 <Unused> :

STANDARD COLUMN WIDTHS

Quantity Columns : 8
Total cost Columns : 12
Unit Cost Columns : 14

SUMMARY FEATURES

Round Totals Column : N-None
Contingency Notes : Yes
Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)
Show Markup at Level : 2
Display Indirect/Owner Markup as : B - Percent of Total
CSI Sort at Level : (None)

** PROJECT SETTINGS **

REPORT SELECTION

Project Settings : Y Profit Guidelines : N
Contractor Settings : Y
Link Listing : N Measurement Units : U.S.

	REPORT FORMAT TYPE			FOR LEVEL (S)						
	Direct	Indirect	Owner	0	1	2	3	4	5	6
Detail :	Y									
Project :	N	Y	N		Y	Y	Y	N	N	N
Contractor :	N	N		N	N	N	N	N	N	N
Division :	N	N	N	N	N	N	N	N	N	N
System :	N	N	N	N	N	N	N	N	N	N
2nd View :	N									
Crew :	Y			Y	N	N	N	N	N	N
Labor :	Y									
Equipment :	Y									
Prime Labor Cost Level :	N									

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3300.05 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3300.10 SUBMITTALS/IMPLEMENTATION PLANS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3300.12 ENGINEERING							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.15 MOBE, SITE WORK, TEMP FACILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.20 TREATMENT SYSTEM CONSTRUCTION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.25 START UP, TESTING, O&M PLAN							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.30 DEMOBILIZATION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3400.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3400.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3405.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3405.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3405.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3405.60 DEMOBE/DEMO SPH 6PH COMPONENTS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3410.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3410.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3410.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3410.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3415.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3415.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3415.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3415.60 REMOVE/DEMO STEAM EQUIPMENT							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3420. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3420.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3420.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3420.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	ESCALATN DATE BEGIN	ESCALATN DATE END	ESCALATN INDEX BEGIN	ESCALATN INDEX END
3425.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3425.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3425.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3425.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.10 SITE FACILITIES							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3430.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3430.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3430.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3430.60 DEMO/REMOVAL TREATMENT SYSTEM							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3435.49 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3435.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				

** CONTRACTOR SETTINGS **

	AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor										
G&A; 6%	6.00									
PROFIT; 10%	10.00									
BOND; 0.5%	0.50									
PL Mechanical Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
PV Paving Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
EL Electrical Contractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									

No errors detected...

* * * END OF ERROR REPORT * * *

APPENDIX D

Pump-and-Treat System

APPENDIX D-1

Cost Estimate Summary—Pump-and-Treat: Groundwater Treatment Alternative GW-4—Hydraulic Containment and NAPL Removal (30 Years and 100 Years of Operation & Maintenance)

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - GROUNDWATER TREATMENT SYSTEM
ALTERNATIVE GW-4 - HYDRAULIC CONTAINMENT/NAPL REMOVAL (USEPA 1998)

PUMP-AND-TREAT GROUNDWATER TREATMENT
CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:

This alternative is an update of Alternative GW-4, Hydraulic Containment/NAPL Removal, which was described and costed in a 1998 feasibility study prepared for USEPA by ICF Kaiser Engineers, Inc. The 1998 estimate has been adjusted to 2001 pricing by URS and the period of operation extended from 30 years to 100 years. This alternative includes groundwater and NAPL extraction and treatment using physical, biological, and chemical units; treated water discharge to the adjacent slough; and short- and long-term monitoring for 100 years.

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300 CAPITAL COSTS					
3300.05 GENERAL CONDITIONS					
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1	JOB	710,371.00	710,371	6 months of procurement, 18 months of construction support.
3300.05.02 ADMINISTRATION HOME OFFICE	1	JOB	376,235.00	376,235	Management and cost control.
3300.05.03 PURCHASING	1	JOB	71,669.00	71,669	Procurement of equipment, materials, supplies, subcontractors.
3300.05.06 FIRST AID, FIRE, TRAFFIC & SECURITY	1	JOB	156,867.00	156,867	Includes 24-hour security.
3300.05.07 HEALTH & SAFETY	1	JOB	52,920.00	52,920	Equipment and supplies, site-specific training and medical.
3300.05.09 TEMPORARY CONSTRUCTION FACILITIES	1	JOB	156,384.00	156,384	Contractor's office and storage, utility connections.
3300.05.10 PROJECT UTILITIES	1	JOB	17,577.00	17,577	Service fees for construction period.
SUBTOTAL GENERAL CONDITIONS	**1**	**JOB**		**1,542,023**	
Scope Contingencies 5%				77,101	Risk associated with incomplete design.
SUBTOTAL				**1,619,124**	
Bid Contingencies 10%				161,912	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCLUDING CONTINGENCY				**1,781,037**	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS					
3300.10.01 Construction Work Plan	1	EA	11,222.00	11,222	Work activities, sequence, and schedules.
3300.10.02 Contractors Quality Control Management Plan	1	EA	9,412.00	9,412	Quality control responsibility, procedures, and corrective action.
3300.10.03 Contractors Chemical Quality Control Plan	1	EA	15,445.00	15,445	Chemical quality control responsibility, controls, validation
3300.10.05 Regulatory Compliance Plan/Update	1	EA	49,941.00	49,941	Regulatory requirements, reporting, and compliance activities.
3300.10.06 Traffic Routing Plan	1	EA	1,271.00	1,271	Impact to W. Washington Street, internal traffic routing & safety.
3300.10.07 Site Health and Safety Plan	1	EA	12,989.00	12,989	Worker and visitor health and safety requirements, procedures.
3300.10.15 Performance Testing Plan	1	EA	9,204.00	9,204	NAPL/groundwater treatment system testing, control.
3300.10.41 Subcontracting Plan	1	EA	3,295.00	3,295	Competitive and non-discriminatory policies and procedures.
3300.10.42 Environmental Protection Plan	1	EA	4,333.00	4,333	Site-specific policies and procedures.
3300.10.43 Correct/Emerg Contingency Action Plan	1	EA	3,805.00	3,805	Emergency response policies and procedures.
SUBTOTAL SUBMITTALS/IMPLEMENTATION PLANS	**1**	**JOB**		**120,917**	
Scope Contingencies 5%				6,046	Risk associated with incomplete design.
SUBTOTAL				**126,963**	
Bid Contingencies 5%				6,348	Risks associated with changed conditions after contract award.
TOTAL SUBMITTALS/IMPLEMENTATION PLANS INCL. CONTINGENCY				**133,311**	
3300.12 ENGINEERING					
3300.12.10 Completion Design - Civil	1	JOB	137,024.00	137,024	Building structure, concrete, pipelines, utility extensions.
3300.12.15 Completion Design - Process	1	JOB	288,669.00	288,669	Wastewater treatment system, equipment, plant piping
3300.12.20 Completion Design - Electrical	1	JOB	161,572.00	161,572	Services, controls, lighting, instrumentation, motors.
3300.12.26 PCS Programming	1	JOB	63,476.00	63,476	Process control, programmable logic control, interfaces.
3300.12.32 Completion Design - Mechanical	1	JOB	0.00	0	Piping, instrumentation, HVAC, plumbing.
SUBTOTAL ENGINEERING	**1**	**JOB**		**650,741**	
Scope Contingencies 10%				65,074	Risk associated with incomplete design.
SUBTOTAL				**715,815**	
Bid Contingencies 10%				71,582	Risks associated with changed conditions after contract award.
TOTAL ENGINEERING INCLUDING CONTINGENCY				**787,397**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3300.15 MOBE, SITE WORK, TEMP FACILITIES					
3300.15.01 CLEAR SITE BRUSH	30	ACR	723.52	21,706	Site preparation for field activities.
3300.15.02 MOBE EQUIP & FACILITIES	1	JOB	45,115.00	45,115	Heavy equipment, personnel to project site.
3300.15.05 TEMPORARY FACILITIES	1	JOB	184,938.00	184,938	Trailers, utilities (water, sewer, electricity, phones), paving.
3300.15.08 SIGNS, BARRICADES	1	JOB	117,958.00	117,958	Traffic, dust, erosion, and site cleaning.
3300.15.92 SURVEYS	1	JOB	14,062.00	14,062	Layout and construction control surveys.
3300.15.97 MEETINGS	2	EA	8,187.00	16,374	Preconstruction meeting, coordination meetings.
SUBTOTAL MOBE, SITE WORK, TEMP FACILITIES	**1**	**JOB**		**400,153**	
Scope Contingencies 10%				40,015	Risk associated with incomplete design.
SUBTOTAL				**440,168**	
Bid Contingencies 5%				22,008	Risks associated with changed conditions after contract award.
TOTAL MOBE, SITE WORK, TEMP FACILITIES INCL CONTINGENCY				**462,176**	
3300.20 TREATMENT SYSTEM CONSTRUCTION					
3300.20.01 TREATMENT PLANT BUILDING	6000	SFT	63.22	379,326	Metal building, 60 ft by 100 ft, concrete slab.
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1	JOB	2,253,727.00	2,253,727	Expedite fabrication, submittals, purchasing, shipping & install.
3300.20.07 WELL INSTRUMENTS/CONTROLS	1	JOB	53,231.00	53,231	For E Zone well only.
3300.20.10 INSTALL WELLS	1	JOB	2,996,193.00	2,996,193	Cables, instruments, and power supply.
3300.20.15 PIPING	1	JOB	351,825.00	351,825	Extraction, injection wells, instrumentation, and pumps.
SUBTOTAL TREATMENT SYSTEM CONSTRUCTION	**1**	**JOB**		**6,034,302**	
Scope Contingencies 10%				603,430	Risk associated with incomplete design.
SUBTOTAL				**6,637,732**	
Bid Contingencies 10%				663,773	Risks associated with changed conditions after contract award.
TOTAL TREATMENT SYSTEM CONSTRUCTION INCL CONTINGENCY				**7,301,505**	
3300.25 STARTUP, TESTING, O&M MANUAL					
3300.25.05 O&M MANUAL	1	JOB	54,371.00	54,371	Operation and maintenance procedures and system control.
3300.25.10 STARTUP/COMMISSION TREATMENT SYSTEM	1	JOB	320,734.00	320,734	Startup, equipment shake-down, training and testing.
SUBTOTAL STARTUP, TESTING, O&M MANUAL	1	JOB		**375,105**	
Scope Contingencies 10%				37,511	Risk associated with incomplete design.
SUBTOTAL				**412,616**	
Bid Contingencies 10%				41,262	Risks associated with changed conditions after contract award.
TOTAL STARTUP, TESTING, O&M MANUAL INCL CONTINGENCY				**453,877**	
3300.30 DEMOBILIZATION					
3300.30.21 DEMOBILIZATION (CONSTRUCTION)	1	JOB	7,114.00	7,114	Remove construction equipment and personnel from site.
3300.30.22 REPORTS, CLOSEOUT	1	JOB	30,705.00	30,705	Closeup of chemical testing, health & safety, record drawings.
SUBTOTAL DEMOBILIZATION	**1**	**JOB**		**37,819**	
Scope Contingencies 10%				3,782	Risk associated with incomplete design.
SUBTOTAL				**41,601**	
Bid Contingencies 10%				4,160	Risks associated with changed conditions after contract award.
TOTAL DEMOBILIZATION INCLUDING CONTINGENCY				**45,761**	
TOTAL CAPITAL COSTS	**1**	**JOB**		**9,161,060**	
TOTAL CAPITAL COST, INCLUDING CONTINGENCY			$	10,965,064	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400 1ST YEAR O&M					
3400.05 GENERAL CONDITIONS					
3400.05.05 OFFSITE ADMINISTRATIVE COSTS	12	MO	8,164.92	97,979	Management, administration, procurement, and data analysis.
SUBTOTAL GENERAL CONDITIONS				**97,979**	
Scope Contingencies 5%				4,899	Risk associated with incomplete design.
SUBTOTAL				**102,878**	
Bid Contingencies 10%				10,288	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCL CONTINGENCY				**113,166**	
3400.10 SITE FACILITIES/SECURITY	**12**	**MO**	**19,371.33**	**232,456**	Electrical, mechanical, and instrumentation support, facilities.
Scope Contingencies 5%				11,623	Risk associated with incomplete design.
SUBTOTAL				**244,079**	
Bid Contingencies 5%				12,204	Risks associated with changed conditions after contract award.
TOTAL SITE FACILITIES INCLUDING CONTINGENCY				**256,283**	
3400.15 HEALTH & SAFETY	**12**	**MO**	**1,171.83**	**14,062**	Personal protective equipment, health and safety monitoring.
Scope Contingencies 5%				703	Risk associated with incomplete design.
SUBTOTAL				**14,765**	
Bid Contingencies 5%				738	Risks associated with changed conditions after contract award.
TOTAL HEALTH & SAFETY INCLUDING CONTINGENCY				**15,503**	
3400.20 MATERIALS & SUPPLIES	**12**	**MO**	**398.42**	**4,781**	Routine maintenance supplies and materials.
Scope Contingencies 10%				478	Risk associated with incomplete design.
SUBTOTAL				**5,259**	
Bid Contingencies 10%				526	Risks associated with changed conditions after contract award.
TOTAL MATERIALS & SUPPLIES INCL CONTINGENCY				**5,785**	
3400.25 MAINTENANCE	**12**	**MO**	**6,249.76**	**74,997**	Parts, PLC and well maintenance, well redevelopment.
Scope Contingencies 10%				7,500	Risk associated with incomplete design.
SUBTOTAL				**82,497**	
Bid Contingencies 10%				8,250	Risks associated with changed conditions after contract award.
TOTAL MAINTENANCE INCL CONTINGENCY				**90,747**	
3400.30 UTILITIES	**12**	**MO**	**8671.54**	**104,058**	Electricity and phones.
Scope Contingencies 10%				10,406	Risk associated with incomplete design.
SUBTOTAL				**114,464**	
Bid Contingencies 10%				11,446	Risks associated with changed conditions after contract award.
TOTAL UTILITIES INCLUDING CONTINGENCY				**125,911**	
3400.35 SITE O&M LABOR & MISC EQUIPMENT	**12**	**MO**	**25,110.91**	**301,331**	Plant manager, operator, 1 shift/day, 5 days/week, 52 weeks/year.
Scope Contingencies 10%				30,133	Risk associated with incomplete design.
SUBTOTAL				**331,464**	
Bid Contingencies 10%				33,146	Risks associated with changed conditions after contract award.
TOTAL SITE O&M LABOR & MISC EQ INCL CONTINGENCY				**364,610**	
3400.40 CHEMICALS	**12**	**MO**	**2,445.74**	**29,349**	Granular activated carbon, nutrients, air.
Scope Contingencies 10%				2,935	Risk associated with incomplete design.
SUBTOTAL				**32,284**	
Bid Contingencies 10%				3,228	Risks associated with changed conditions after contract award.
TOTAL CHEMICALS INCLUDING CONTINGENCY				**35,512**	

	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
3400.45 DISPOSALS					
3400.45.05 SLUDGE	12	MO	658.76	7,905	33 tons per year.
3400.45.15 CARBON (GAC, LIQUID PHASE)	12	MO	856.85	10,282	Offsite disposal of 19,075 pounds per year.
3400.45.20 PPE & MISC	12	MO	195.31	2,344	Disposal allowance.
3400.45.25 OILY WASTE	12	MO	1,676.69	20,120	Estimate assumes average recovery of 8,000 gal/year during Year 1 - 5, decreasing to 5,000 gal/yr (Year 6 - 10), 3,000 gal/yr (Year 11 - 15), and 1,500 gal/yr (Year 16 - 20). For Year 21 - 100, an average of 156 gal/yr is used. Cumulative recovery is 100,000 gallons over 100 years.
SUBTOTAL DISPOSALS				**40,651**	
Scope Contingencies 10%				4,065	Risk associated with incomplete design.
SUBTOTAL				**44,716**	
Bid Contingencies 10%				4,472	Risks associated with changed conditions after contract award.
TOTAL DISPOSALS INCLUDING CONTINGENCY				**49,188**	
3400.50 SAMPLING & ANALYSIS					
3400.50.05 PERFORMANCE MONITORING	12	MO	7,530.42	90,365	See Table 3-2 of Cost Estimate Report.
3400.50.10 COMPLIANCE MONITORING	12	MO	19,095.54	229,146	See Table 3-2 of Cost Estimate Report.
3400.55.05 DATA VALIDATION	12	MO	4,756.42	57,077	Validation of chemical data for air, water, and process control.
SUBTOTAL SAMPLING & ANALYSIS	**12**	**MO**		**376,589**	
Scope Contingencies 10%				37,659	Risk associated with incomplete design.
SUBTOTAL				**414,247**	
Bid Contingencies 10%				41,425	Risks associated with changed conditions after contract award.
TOTAL SAMPLING & ANALYSIS INCL CONTINGENCY				**455,672**	
TOTAL 1ST YEAR O&M	**12**	**MO**		**1,276,253**	
TOTAL 1ST YEAR O&M COST, INCLUDING CONTINGENCY			**$**	**1,512,377**	

TOTAL McCORMICK & BAXTER SUPERFUND SITE PUMP & TREAT

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Five Year Review Report	5	1	EA	5,000	5,000	1 report at end of Year 5
Update O&M Plan	5	1	EA	1,500	1,500	Update Plan
Five Year Review Report	10	1	EA	5,000	5,000	1 report at end of Year 10
Update O&M Plan	10	1	EA	1,500	1,500	Update Plan
Five Year Review Report	15	1	EA	5,000	5,000	1 report at end of Year 15
Update O&M Plan	15	1	EA	1,500	1,500	Update Plan
Five Year Review Report	20	1	EA	5,000	5,000	1 report at end of Year 20
Update O&M Plan	20	1	EA	1,500	1,500	Update Plan
Five Year Review Report	25	1	EA	5,000	5,000	1 report at end of Year 25
Update O&M Plan	25	1	EA	1,500	1,500	Update Plan
Five Year Review Report	30	1	EA	5,000	5,000	1 report at end of Year 30
Update O&M Plan	30	1	EA	1,500	1,500	Update Plan
Five Year Review Report	35	1	EA	5,000	5,000	1 report at end of Year 35
Update O&M Plan	35	1	EA	1,500	1,500	Update Plan
Five Year Review Report	40	1	EA	5,000	5,000	1 report at end of Year 40
Update O&M Plan	40	1	EA	1,500	1,500	Update Plan
Five Year Review Report	45	1	EA	5,000	5,000	1 report at end of Year 45
Update O&M Plan	45	1	EA	1,500	1,500	Update Plan
Five Year Review Report	50	1	EA	5,000	5,000	1 report at end of Year 50
Update O&M Plan	50	1	EA	1,500	1,500	Update Plan
Five Year Review Report	55	1	EA	5,000	5,000	1 report at end of Year 55
Update O&M Plan	55	1	EA	1,500	1,500	Update Plan
Five Year Review Report	60	1	EA	5,000	5,000	1 report at end of Year 60
Update O&M Plan	60	1	EA	1,500	1,500	Update Plan
Five Year Review Report	65	1	EA	5,000	5,000	1 report at end of Year 65
Update O&M Plan	65	1	EA	1,500	1,500	Update Plan
Five Year Review Report	70	1	EA	5,000	5,000	1 report at end of Year 70
Update O&M Plan	70	1	EA	1,500	1,500	Update Plan
Five Year Review Report	75	1	EA	5,000	5,000	1 report at end of Year 75
Update O&M Plan	75	1	EA	1,500	1,500	Update Plan
Five Year Review Report	80	1	EA	5,000	5,000	1 report at end of Year 80
Update O&M Plan	80	1	EA	1,500	1,500	Update Plan
Five Year Review Report	85	1	EA	5,000	5,000	1 report at end of Year 85
Update O&M Plan	85	1	EA	1,500	1,500	Update Plan
Five Year Review Report	90	1	EA	5,000	5,000	1 report at end of Year 90
Update O&M Plan	90	1	EA	1,500	1,500	Update Plan
Five Year Review Report	95	1	EA	5,000	5,000	1 report at end of Year 95
Update O&M Plan	95	1	EA	1,500	1,500	Update Plan
Remedial Action Report	100	1	EA	100,000	100,000	Final Report

Equipment Repairs/Replacement:						
Treatment System Renovate/Upgrade	20	1	EA	4,078,520	4,078,520	See Page 8 of this Summary for estimate
Treatment System Renovate/Upgrade	40	1	EA	4,078,520	4,078,520	of 20 year renovation/upgrade costs.
Treatment System Renovate/Upgrade	60	1	EA	4,078,520	4,078,520	
Treatment System Renovate/Upgrade	80	1	EA	4,078,520	4,078,520	
Replace Well Extract/LoFlo Pumps	5	43	EA	4,400	189,200	(Add 10% for Engineering/Contracting)
Replace Well Extract/LoFlo Pumps	10	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	15	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	20	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	25	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	30	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	35	43	EA	4,400	189,200	Pump life expected to be 5 years
Replace Well Extract/LoFlo Pumps	40	43	EA	4,400	189,200	(Add 30K for demo/disposal)
Replace Well Extract/LoFlo Pumps	45	43	EA	4,400	189,200	Include 25 Lo-Flo Mon. Well Sampling
Replace Well Extract/LoFlo Pumps	50	43	EA	4,400	189,200	pumps in the total each 5 years.
Replace Well Extract/LoFlo Pumps	55	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	60	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	65	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	70	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	75	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	80	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	85	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	90	43	EA	4,400	189,200	
Replace Well Extract/LoFlo Pumps	95	43	EA	4,400	189,200	
Well Repairs/Replacement:						
Replace Wells (Extraction & Mon.)	10	15	EA	94,600	1,419,000	Assume replace 1/3 of wells every 10 yr.
Replace Wells (Extraction & Mon.)	20	15	EA	94,600	1,419,000	(Add 20K/event for demo/disposals)
Replace Wells (Extraction & Mon.)	30	15	EA	94,600	1,419,000	Included in the 15 Extraction Wells
Replace Wells (Extraction & Mon.)	40	15	EA	94,600	1,419,000	replace each 10 years is 20
Replace Wells (Extraction & Mon.)	50	15	EA	94,600	1,419,000	monitoring well replacements.
Replace Wells (Extraction & Mon.)	60	15	EA	94,600	1,419,000	(Add 10% for Engineering/Contracting)
Replace Wells (Extraction & Mon.)	70	15	EA	94,600	1,419,000	
Replace Wells (Extraction & Mon.)	80	15	EA	94,600	1,419,000	
Replace Wells (Extraction & Mon.)	90	15	EA	94,600	1,419,000	
Demolition/Restoration Site	100	1	JOB	1,650,000	1,650,000	Completion of RA (Including 10% for Engineering/Contracting)

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE	NOTES
Capital Cost	0	10,965,064	1.00000	10,965,064	
Annual O&M Cost x 5 yrs.	1 to 5	7,561,884	0.84439	6,385,142	NAPL recovery - 8,000 gal/year
Annual O&M Cost x 5 yrs.	6 to 10	7,527,075	0.60203	4,531,562	NAPL recovery - 5,000 gal/year
Annual O&M Cost x 5 yrs.	11 to 15	7,503,875	0.42924	3,220,983	NAPL recovery - 3,000 gal/year
Annual O&M Cost x 5 yrs.	16 to 20	7,486,475	0.30604	2,291,191	NAPL recovery - 1,500 gal/year
Annual O&M Cost x 5 yrs.	21 to 25	7,470,885	0.21821	1,630,186	NAPL recovery - 156 gal/year for Year 21 - 100
Annual O&M Cost x 5 yrs.	26 to 30	7,470,885	0.15558	1,162,300	
Annual O&M Cost x 5 yrs.	31 to 35	7,470,885	0.11092	828,704	
Annual O&M Cost x 5 yrs.	36 to 40	7,470,885	0.07909	590,854	
Annual O&M Cost x 5 yrs.	41 to 45	7,470,885	0.05639	421,271	
Annual O&M Cost x 5 yrs.	46 to 50	7,470,885	0.04020	300,360	
Annual O&M Cost x 5 yrs.	51 to 55	7,470,885	0.02866	214,153	
Annual O&M Cost x 5 yrs.	56 to 60	7,470,885	0.02044	152,688	
Annual O&M Cost x 5 yrs.	61 to 65	7,470,885	0.01457	108,864	
Annual O&M Cost x 5 yrs.	66 to 70	7,470,885	0.01039	77,619	
Annual O&M Cost x 5 yrs.	71 to 75	7,470,885	0.00741	55,341	
Annual O&M Cost x 5 yrs.	76 to 80	7,470,885	0.00528	39,457	
Annual O&M Cost x 5 yrs.	81 to 85	7,470,885	0.00377	28,133	
Annual O&M Cost x 5 yrs.	86 to 90	7,470,885	0.00268	20,058	
Annual O&M Cost x 5 yrs.	91 to 95	7,470,885	0.00191	14,301	
Annual O&M Cost x 5 yrs.	96 to 100	7,470,885	0.00136	10,197	
Periodic Cost	5	6,500.00	0.71299	4,634	
Periodic Cost	10	1,614,700.00	0.50835	820,832	
Periodic Cost	15	195,700.00	0.36245	70,931	
Periodic Cost	20	5,693,220.00	0.25842	1,471,236	
Periodic Cost	25	195,700.00	0.18425	36,058	
Periodic Cost	30	1,614,700.00	0.13137	212,118	
Periodic Cost	35	195,700.00	0.09366	18,330	
Periodic Cost	40	5,693,220.00	0.06678	380,195	
Periodic Cost	45	195,700.00	0.04761	9,318	
Periodic Cost	50	1,614,700.00	0.03395	54,815	
Periodic Cost	55	195,700.00	0.02420	4,737	
Periodic Cost	60	5,693,220.00	0.01726	98,250	
Periodic Cost	65	6,584.00	0.01230	81	
Periodic Cost	70	1,614,700.00	0.00877	14,165	
Periodic Cost	75	195,700.00	0.00625	1,224	
Periodic Cost	80	5,693,220.00	0.00446	25,390	
Periodic Cost	85	195,700.00	0.00318	622	
Periodic Cost	90	1,614,700.00	0.00227	3,661	
Periodic Cost	95	195,700.00	0.00162	316	
Periodic Cost	100	1,850,000.00	0.00115	2,132	Includes 1.65M for Demo, Disposals +200,000 for RAR

TOTAL COSTS 30 YEARS	**$65,306,665**		
TOTAL COSTS 100 YEARS	**$194,853,699**		
TOTAL PRESENT VALUE OF GW-4 PUMP & TREAT OPTION 30 YEARS		**$33,025,565**	(30 yr present value includes Demo/ Disposal & RAR at 30 year present value)
TOTAL PRESENT VALUE OF GW-4 PUMP & TREAT OPTION 100 YEARS		**$ 36,277,473**	

McCORMICK & BAXTER
PUMP & TREAT RENOVATION AND UPGRADE COSTS
20 YEAR FREQUENCY

ITEM	50% ORIGINAL COST	DEMO DISPOSAL COST 10%	WORK W/EXIST OPERATION 10%	TOTAL COSTS
General Conditions	890,518	0	0	890,518
Submittals/Plans	66,656	0	0	66,656
Engineering	393,698	0	0	393,698
Mobe/Site Work/Temp Facilities	231,088	0	0	231,088
Treatment Plant Building	229,492	22,949	25,244	277,685
Treatment System Equipment, F&I	1,363,505	136,350	149,985	1,649,840
Well Instruments & Controls	32,205	3,221	3,543	38,968
Piping	212,854	21,285	23,414	257,553
Startup/Commission Plant	226,939	0	22,694	249,632
Demobe	22,881	0	0	22,881
	3,669,834	**183,806**	**224,880**	**4,078,520**

Note: Assume that due to yearly maintenance or longer life of some items in the plant that only 50% of the original capital costs will be required at 20 year intervals for plant refurbishment and upgrades included all general conditions, engineering, and construction costs.

APPENDIX D-2

Costlink© Pump-and-Treat Capital Costs and Operation & Maintenance Estimate

---

McCORMICK & BAXTER SUPERFUND SITE
Cost Update for Groundwater Treatment System
Alternative GW-4- Containment through Hydraulic Control with Systematic NAPL Removal
"Soils & Groundwater Feasibility Study Report" prepared for U.S. Environmental Protection Agency
by ICF Kaiser Engineers, Inc., July 1998

Designed By: ICF Kaiser
Estimated By: URS Corporation Staff

Prepared By: John E. Spear

Preparation Date: 11/09/01
Effective Date of Pricing: 07/17/01
Est Construction Time: 600 Days

Sales Tax: 0.00

C o s t L i n k
Software Copyright (c) 1985-1998
by Building Systems Design, Inc.
Release 1.6c

SUMMARY REPORTS SUMMARY PAGE

PROJECT OWNER SUMMARY - ACCOUNT....1
PROJECT OWNER SUMMARY - SYSTEM....2
PROJECT OWNER SUMMARY - SUBSYSTM....3
PROJECT INDIRECT SUMMARY - ACCOUNT....6
PROJECT INDIRECT SUMMARY - SYSTEM....7
PROJECT INDIRECT SUMMARY - SUBSYSTM....8
CONTRACTOR DIRECT SUMMARY....13
CONTRACTOR INDIRECT SUMMARY....14

DETAILED ESTIMATE DETAIL PAGE

3300. CAPITAL COSTS
05. GENERAL CONDITIONS
01. FIELD SUPERVISION & MANAGEMENT....1
02. ADMINISTRATION HOME OFFICE....2
03. PURCHASING....3
06. FIRST AID, FIRE, TRAFFIC, SECUR....3
07. HEALTH & SAFETY....4
09. TEMP CONSTRUCTION FACILITIES....5
10. PROJECT UTILITIES....6
10. SUBMITTALS/IMPLEMENTATION PLANS
01. Construction Work Plan....7
02. Contractors QC Management Plan....7
03. Contractors Chem Quality Control....8
05. Regulatory Compliance Plan/Updat....9
06. Traffic Routing Plan....9
07. Site Health and Safety Plan....10
15. Performance Testing Plan....11
41. Subcontracting Plan....11
42. Environmental Protection Plan....12
43. Correct/Emerg Conting Action Pln....12
12. ENGINEERING
10. COMPLETION DESIGN - CIVIL....14
15. COMPLETION DESIGN - PROCESS....14
20. COMPLETION DESIGN - ELECTRICAL....15
26. PCS PROGRAMMING - GROUNDWATER
15. PC PROGRAMMING....16
20. MMI PROGRAMMING....16
15. MOBE, SITE WORK, TEMP FACILITIES
01. CLEAR SITE BRUSH....17
02. MOBE EQUIP & FACILITIES....17
05. TEMPORARY FACILITIES
05. ROUGH GRADE SITE....17
20. TEMPORARY PAVING....18
25. WATER LINE....18
30. PHONE....19
35. SEWER....20
40. ELECTRICAL SERVICE....20
45. GAS SERVICE....20
50. SITE MAINT/CLEANUP....20

DETAILED ESTIMATE DETAIL PAGE

08. SIGNS, BARRICADES
5. SIGNS....20
10. BARRICADES/TEMP FENCING....21
15. EROSION CONTROL....21
20. STREET CLEANING....22
25. DUST CONTROL....22
30. STORMWATER CONTROL....22
92. SURVEYS
5. INITIAL LAYOUT SURVEY....22
10. SURVEY CONTROLS....23
97. MEETINGS
01. Preconstruction Meeting....23
03. Coordination Meeting....24
20. TREATMENT SYSTEM CONSTRUCTION
01. TREATMENT PLANT BUILDING
07. TELEPHONE/COM DISTRIBUTION....26
10. BUILDING....26
15. GWTP OFFICE....26
20. PAVING....26
25. FIRE ALARM SYSTEM....27
30. PLUMBING....27
05. TREATMENT SYSTEM EQUIP. F&I
5. EXPEDITOR/QC EQUIP. FABRICATION....27
01. EQUIP SUBMITTAL REVIEW....28
10. EQUIPMENT, PURCHASE & SHIPPING....28
12. INSTRUMENTATION/CONTROLLERS....29
13. COMPUTER....30
15. EQUIPMENT INSTALLATION....30
16. TREATMENT SYSTEM ELECTRICAL & IN....31
17. MECHANICAL....31
07. WELL INSTRUMENTS/CONTROLS
10. INSTRUMENT CABLE TO WELLHEADS....31
30. WELL INSTRUMENTATION....32
40. ELECTRICAL POWER TO WELLS....32
10. INSTALL WELLS
5. EXTRACTION WELLS....33
20. MONITORING WELLS....35
30. ANALYTICALS SOILS....37
35. ANALYTICALS LIQUIDS....37
40. LABOR & ODC's....38
45. DISPOSALS....39
15. PIPING
10. LIQUID RECOVERY SYSTEM....40
35. AIR PIPING....41
40. DISCHARGE PIPING....43
25. START UP, TESTING, O&M PLAN
5. O&M MANUAL
10. PCS Commissioning Manual....44
13. Preliminary Draft - O&M Manual....44
18. Revised Draft - O&M Manual....45
23. Final - O&M Manual....45

DETAILED ESTIMATE DETAIL PAGE

10. STARTUP/COMMISSION TREATMENT SYS
5. ENGINEERS & TECHNICIANS....46
10. TRAVEL & PER DIEM....47
15. EQUIPMENT/SUPPLIES....48
25. UTILITIES/SITE FACILITIES....48
26. OPERATING/PROCESS UTILITIES....49
30. CHEMICALS....50
35. FILTERS, OTHER CONSUMABLES....50
40. HEALTH & SAFETY....50
45. DISPOSALS STARTUP....50
50. PERSONNEL TRAINING....50
55. SAMPLING/ANALYSIS; STARTUP....51
30. DEMOBILIZATION
21. DEMOBILIZATION
01. Removal of Temp Facilities....57
02. Removal of Temp Utilities....57
04. Demobe of Construction Equipment....57
22. REPORTS, CLOSEOUT
5. Closeout Safety Report....58
10. Record Drawings....58
15. Chemical Data Final Report....58
20. Remedial Action Report....59
3400. 1ST YEAR O&M
5. GENERAL CONDITIONS
05. OFFSITE ADMINISTRATIVE COSTS....60
10. SITE FACILITIES/SECURITY....61
15. HEALTH & SAFETY....62
20. MATERIALS & SUPPLIES....63
25. MAINTENANCE....64
30. UTILITIES....65
35. SITE O&M LABOR & MISC EQUIPMENT....66
40. CHEMICALS....67
45. DISPOSALS
5. SLUDGE....68
15. CARBON (GAC, LIQUID PHASE)....68
20. PPE & MISC....68
25. OILY WASTE....68
50. SAMPLING & ANALYSIS
5. PERFORMANCE MONITORING....69
10. COMPLIANCE MONITORING
10. PERIMETER MONITORING WELLS....70
15. WASTE DISPOSAL CHARACTERIZATION....71
20. GWTP DISCHARGE TO MORMON SLOUGH....73
25. SAMPLING TECHNICIANS....74
55. QC & ANALYTICAL DATA VALIDATION
5. DATA VALIDATION
5. PROCESS SAMPLES....76
10. MONITORING WELL SAMPLES....76
15. AIR MONITORING SAMPLES....76
20. MISC SAMPLES....76

BACKUP REPORTS BACKUP PAGE

CREW BACKUP.....1
LABOR BACKUP.....7
EQUIPMENT BACKUP.....8

* * * END TABLE OF CONTENTS * * *

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST
3300	CAPITAL COSTS	1.00	JOB	9,161,058	832,959	971,045	10,965,061	10965061.44
3400	1ST YEAR O&M	12.00	MO	1,276,254	110,401	125,723	1,512,378	126031.49
TOTAL McCORMICK&BAXTER SUPERFUND SITE		1.00	EA	10,437,312	943,359	1,096,768	12,477,439	12477439.36

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST
3300	CAPITAL COSTS							
3300.05	GENERAL CONDITIONS	1.00	JOB	1,542,023	77,101	161,912	1,781,036	1781036.50
3300.10	SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	120,917	6,046	6,348	133,311	133310.52
3300.12	ENGINEERING	1.00	JOB	650,741	65,074	71,581	787,396	787396.17
3300.15	MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	400,153	40,015	22,008	462,176	462176.23
3300.20	TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	6,034,301	603,430	663,773	7,301,504	7301504.17
3300.25	START UP, TESTING, O&M PLAN	1.00	JOB	375,105	37,510	41,262	453,877	453876.70
3300.30	DEMOBILIZATION	1.00	JOB	37,819	3,782	4,160	45,761	45761.17
	TOTAL CAPITAL COSTS	1.00	JOB	9,161,058	832,959	971,045	10,965,061	10965061.44
3400	1ST YEAR O&M							
3400. 5	GENERAL CONDITIONS	12.00	MO	97,979	4,899	10,288	113,166	9430.48
3400.10	SITE FACILITIES/SECURITY	12.00	MO	232,456	11,623	12,204	256,283	21356.89
3400.15	HEALTH & SAFETY	12.00	MO	14,062	703	738	15,503	1291.94
3400.20	MATERIALS & SUPPLIES	12.00	MO	4,781	478	526	5,785	482.09
3400.25	MAINTENANCE	12.00	MO	74,997	7,500	8,250	90,747	7562.21
3400.30	UTILITIES	12.00	MO	104,059	10,406	11,446	125,911	10492.57
3400.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	301,331	30,133	33,146	364,610	30384.20
3400.40	CHEMICALS	12.00	MO	29,349	2,935	3,228	35,512	2959.34
3400.45	DISPOSALS	12.00	MO	40,651	4,065	4,472	49,188	4099.01
3400.50	SAMPLING & ANALYSIS	12.00	MO	319,512	31,951	35,146	386,609	32217.45
3400.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	57,077	5,708	6,279	69,064	5755.31
	TOTAL 1ST YEAR O&M	12.00	MO	1,276,254	110,401	125,723	1,512,378	126031.49

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST
3300	CAPITAL COSTS							
3300.05	GENERAL CONDITIONS							
3300.05.01	FIELD SUPERVISION & MANAGEMENT	1.00	JOB	710,371	35,519	74,589	820,478	820478.33
3300.05.02	ADMINISTRATION HOME OFFICE	1.00	JOB	376,235	18,812	39,505	434,551	434551.16
3300.05.03	PURCHASING	1.00	JOB	71,669	3,583	7,525	82,778	82777.84
3300.05.06	FIRST AID, FIRE, TRAFFIC, SECUR	1.00	JOB	156,867	7,843	16,471	181,181	181181.11
3300.05.07	HEALTH & SAFETY	1.00	JOB	52,920	2,646	5,557	61,122	61122.12
3300.05.09	TEMP CONSTRUCTION FACILITIES	1.00	JOB	156,384	7,819	16,420	180,624	180623.99
3300.05.10	PROJECT UTILITIES	1.00	JOB	17,577	879	1,846	20,302	20301.95
	TOTAL GENERAL CONDITIONS	1.00	JOB	1,542,023	77,101	161,912	1,781,036	1781036.50
3300.10	SUBMITTALS/IMPLEMENTATION PLANS							
3300.10.01	Construction Work Plan	1.00	EA	11,222	561	589	12,372	12372.16
3300.10.02	Contractors QC Management Plan	1.00	EA	9,412	471	494	10,377	10376.88
3300.10.03	Contractors Chem Quality Control	1.00	EA	15,445	772	811	17,028	17027.80
3300.10.05	Regulatory Compliance Plan/Updat	1.00	EA	49,941	2,497	2,622	55,060	55060.01
3300.10.06	Traffic Routing Plan	1.00	EA	1,271	64	67	1,401	1400.85
3300.10.07	Site Health and Safety Plan	1.00	EA	12,989	649	682	14,320	14319.89
3300.10.15	Performance Testing Plan	1.00	EA	9,204	460	483	10,147	10147.43
3300.10.41	Subcontracting Plan	1.00	EA	3,295	165	173	3,633	3632.94
3300.10.42	Environmental Protection Plan	1.00	EA	4,333	217	228	4,778	4777.60
3300.10.43	Correct/Emerg Conting Action Pln	1.00	EA	3,805	190	200	4,195	4194.94
	TOTAL SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	120,917	6,046	6,348	133,311	133310.52
3300.12	ENGINEERING							
3300.12.10	COMPLETION DESIGN - CIVIL	1.00	JOB	137,024	13,702	15,073	165,800	165799.55
3300.12.15	COMPLETION DESIGN - PROCESS	1.00	JOB	288,669	28,867	31,754	349,289	349289.01
3300.12.20	COMPLETION DESIGN - ELECTRICAL	1.00	JOB	161,572	16,157	17,773	195,502	195502.02
3300.12.26	PCS PROGRAMMING - GROUNDWATER							
	TOTAL ENGINEERING	1.00	JOB	650,741	65,074	71,581	787,396	787396.17
3300.15	MOBE, SITE WORK, TEMP FACILITIES							
3300.15.01	CLEAR SITE BRUSH	1.00	ACR	21,706	2,171	1,194	25,070	25070.01
3300.15.02	MOBE EQUIP & FACILITIES	1.00	JOB	45,115	4,512	2,481	52,108	52108.35
3300.15.05	TEMPORARY FACILITIES	1.00	JOB	184,938	18,494	10,172	213,603	213602.95
3300.15.08	SIGNS, BARRICADES	1.00	JOB	117,958	11,796	6,488	136,242	136241.73
3300.15.92	SURVEYS	1.00	JOB	14,062	1,406	773	16,242	16241.56
3300.15.97	MEETINGS	1.00	EA	16,374	1,637	901	18,912	18911.62

	QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST
TOTAL MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	400,153	40,015	22,008	462,176	462176.23
3300.20 TREATMENT SYSTEM CONSTRUCTION							
3300.20.01 TREATMENT PLANT BUILDING	1.00	JOB	379,326	37,933	41,726	458,984	458984.02
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	2,253,727	225,373	247,910	2,727,009	2727009.24
3300.20.07 WELL INSTRUMENTS/CONTROLS	1.00	JOB	53,231	5,323	5,855	64,410	64409.59
3300.20.10 INSTALL WELLS	1.00	JOB	2,996,193	299,619	329,581	3,625,393	3625393.36
3300.20.15 PIPING	1.00	JOB	351,825	35,182	38,701	425,708	425707.97
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	6,034,301	603,430	663,773	7,301,504	7301504.17
3300.25 START UP, TESTING, O&M PLAN							
3300.25. 5 O&M MANUAL	1.00	JOB	54,371	5,437	5,981	65,789	65789.01
3300.25.10 STARTUP/COMMISSION TREATMENT SYS	1.00	JOB	320,734	32,073	35,281	388,088	388087.68
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	375,105	37,510	41,262	453,877	453876.70
3300.30 DEMOBILIZATION							
3300.30.21 DEMOBILIZATION	1.00	JOB	7,114	711	783	8,608	8608.41
3300.30.22 REPORTS, CLOSEOUT	1.00	JOB	30,705	3,070	3,378	37,153	37152.76
TOTAL DEMOBILIZATION	1.00	JOB	37,819	3,782	4,160	45,761	45761.17
3400 1ST YEAR O&M							
3400. 5 GENERAL CONDITIONS							
3400. 5.05 OFFSITE ADMINISTRATIVE COSTS	1.00	MO	97,979	4,899	10,288	113,166	113165.80
TOTAL GENERAL CONDITIONS	12.00	MO	97,979	4,899	10,288	113,166	9430.48
3400.10 SITE FACILITIES/SECURITY	12.00	MO	232,456	11,623	12,204	256,283	21356.89
3400.15 HEALTH & SAFETY	12.00	MO	14,062	703	738	15,503	1291.94
3400.20 MATERIALS & SUPPLIES	12.00	MO	4,781	478	526	5,785	482.09
3400.25 MAINTENANCE	12.00	MO	74,997	7,500	8,250	90,747	7562.21
3400.30 UTILITIES	12.00	MO	104,059	10,406	11,446	125,911	10492.57
3400.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	301,331	30,133	33,146	364,610	30384.20
3400.40 CHEMICALS	12.00	MO	29,349	2,935	3,228	35,512	2959.34
3400.45 DISPOSALS							
3400.45. 5 SLUDGE	12.00	MO	7,905	791	870	9,565	797.10
3400.45.15 CARBON (GAC, LIQUID PHASE)	12.00	MO	10,282	1,028	1,131	12,441	1036.79
3400.45.20 PPE & MISC	12.00	MO	2,344	234	258	2,836	236.32
3400.45.25 OILY WASTE	12.00	MO	20,120	2,012	2,213	24,346	2028.80

	QUANTY UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST
TOTAL DISPOSALS	12.00 MO	40,651	4,065	4,472	49,188	4099.01
3400.50 SAMPLING & ANALYSIS						
3400.50. 5 PERFORMANCE MONITORING	1.00 MO	90,365	9,037	9,940	109,342	109342.15
3400.50.10 COMPLIANCE MONITORING	12.00 MO	229,146	22,915	25,206	277,267	23105.60
TOTAL SAMPLING & ANALYSIS	12.00 MO	319,512	31,951	35,146	386,609	32217.45
3400.55 QC & ANALYTICAL DATA VALIDATION						
3400.55. 5 DATA VALIDATION	1.00 MO	57,077	5,708	6,279	69,064	69063.77
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	57,077	5,708	6,279	69,064	5755.31

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS	1.00	JOB	7,817,736	469,064	828,680	45,577	9,161,058	9161057.54
3400 1ST YEAR O&M	12.00	MO	1,089,112	65,347	115,446	6,350	1,276,254	106354.51
TOTAL McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	8,906,848	534,411	944,126	51,927	10,437,312	10437311.63
Scope Contingency	9.04	%					943,359	
SUBTOTAL							11,380,671	
Bid Contingency	9.64	%					1,096,768	
TOTAL INCL OWNER COSTS							12,477,439	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS	1.00	JOB	1,315,910	78,955	139,486	7,672	1,542,023	1542022.94
3300.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	103,186	6,191	10,938	602	120,917	120916.57
3300.12 ENGINEERING	1.00	JOB	555,320	33,319	58,864	3,238	650,741	650740.64
3300.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	341,477	20,489	36,197	1,991	400,153	400152.58
3300.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	5,149,468	308,968	545,844	30,021	6,034,301	6034300.97
3300.25 START UP, TESTING, O&M PLAN	1.00	JOB	320,102	19,206	33,931	1,866	375,105	375104.71
3300.30 DEMOBILIZATION	1.00	JOB	32,274	1,936	3,421	188	37,819	37819.15
TOTAL CAPITAL COSTS	1.00	JOB	7,817,736	469,064	828,680	45,577	9,161,058	9161057.54
Scope Contingency	9.09	%					832,959	
SUBTOTAL							9,994,016	
Bid Contingency	9.72	%					971,045	
TOTAL INCL OWNER COSTS							10,965,061	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS	12.00	MO	83,612	5,017	8,863	487	97,979	8164.92
3400.10 SITE FACILITIES/SECURITY	12.00	MO	198,370	11,902	21,027	1,156	232,456	19371.33
3400.15 HEALTH & SAFETY	12.00	MO	12,000	720	1,272	70	14,062	1171.83
3400.20 MATERIALS & SUPPLIES	12.00	MO	4,080	245	432	24	4,781	398.42
3400.25 MAINTENANCE	12.00	MO	64,000	3,840	6,784	373	74,997	6249.76
3400.30 UTILITIES	12.00	MO	88,800	5,328	9,413	518	104,059	8671.54
3400.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	257,146	15,429	27,257	1,499	301,331	25110.91
3400.40 CHEMICALS	12.00	MO	25,045	1,503	2,655	146	29,349	2445.74
3400.45 DISPOSALS	12.00	MO	34,691	2,081	3,677	202	40,651	3387.61
3400.50 SAMPLING & ANALYSIS	12.00	MO	272,661	16,360	28,902	1,590	319,512	26625.99
3400.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	48,708	2,922	5,163	284	57,077	4756.46
TOTAL 1ST YEAR O&M	12.00	MO	1,089,112	65,347	115,446	6,350	1,276,254	106354.51
Scope Contingency	8.65	%					110,401	
SUBTOTAL							1,386,655	
Bid Contingency	9.07	%					125,723	
TOTAL INCL OWNER COSTS							1,512,378	

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300 CAPITAL COSTS								
3300.05 GENERAL CONDITIONS								
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1.00	JOB	606,206	36,372	64,258	3,534	710,371	710370.85
3300.05.02 ADMINISTRATION HOME OFFICE	1.00	JOB	321,066	19,264	34,033	1,872	376,235	376234.77
3300.05.03 PURCHASING	1.00	JOB	61,160	3,670	6,483	357	71,669	71669.12
3300.05.06 FIRST AID, FIRE, TRAFFIC, SECUR	1.00	JOB	133,865	8,032	14,190	780	156,867	156866.76
3300.05.07 HEALTH & SAFETY	1.00	JOB	45,160	2,710	4,787	263	52,920	52919.59
3300.05.09 TEMP CONSTRUCTION FACILITIES	1.00	JOB	133,453	8,007	14,146	778	156,384	156384.41
3300.05.10 PROJECT UTILITIES	1.00	JOB	15,000	900	1,590	87	17,577	17577.45
TOTAL GENERAL CONDITIONS	1.00	JOB	1,315,910	78,955	139,486	7,672	1,542,023	1542022.94
Scope Contingency	5.00	%					77,101	
SUBTOTAL							1,619,124	
Bid Contingency	10.00	%					161,912	
TOTAL INCL OWNER COSTS							1,781,036	
3300.10 SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01 Construction Work Plan	1.00	EA	9,576	575	1,015	56	11,222	11221.91
3300.10.02 Contractors QC Management Plan	1.00	EA	8,032	482	851	47	9,412	9412.14
3300.10.03 Contractors Chem Quality Control	1.00	EA	13,180	791	1,397	77	15,445	15444.72
3300.10.05 Regulatory Compliance Plan/Updat	1.00	EA	42,618	2,557	4,518	248	49,941	49941.05
3300.10.06 Traffic Routing Plan	1.00	EA	1,084	65	115	6	1,271	1270.62
3300.10.07 Site Health and Safety Plan	1.00	EA	11,084	665	1,175	65	12,989	12988.56
3300.10.15 Performance Testing Plan	1.00	EA	7,854	471	833	46	9,204	9204.02
3300.10.41 Subcontracting Plan	1.00	EA	2,812	169	298	16	3,295	3295.19
3300.10.42 Environmental Protection Plan	1.00	EA	3,698	222	392	22	4,333	4333.43
3300.10.43 Correct/Emerg Conting Action Pln	1.00	EA	3,247	195	344	19	3,805	3804.93
TOTAL SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	103,186	6,191	10,938	602	120,917	120916.57
Scope Contingency	5.00	%					6,046	
SUBTOTAL							126,962	
Bid Contingency	5.00	%					6,348	
TOTAL INCL OWNER COSTS							133,311	
3300.12 ENGINEERING								
3300.12.10 COMPLETION DESIGN - CIVIL	1.00	JOB	116,932	7,016	12,395	682	137,024	137024.43
3300.12.15 COMPLETION DESIGN - PROCESS	1.00	JOB	246,340	14,780	26,112	1,436	288,669	288668.60
3300.12.20 COMPLETION DESIGN - ELECTRICAL	1.00	JOB	137,880	8,273	14,615	804	161,572	161571.92

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.12.26 PCS PROGRAMMING - GROUNDWATER								
TOTAL ENGINEERING	1.00	JOB	555,320	33,319	58,864	3,238	650,741	650740.64
Scope Contingency	10.00	%					65,074	
SUBTOTAL							715,815	
Bid Contingency	10.00	%					71,581	
TOTAL INCL OWNER COSTS							787,396	
3300.15 MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01 CLEAR SITE BRUSH	1.00	ACR	18,523	1,111	1,963	108	21,706	21705.63
3300.15.02 MOBE EQUIP & FACILITIES	1.00	JOB	38,500	2,310	4,081	224	45,115	45115.46
3300.15.05 TEMPORARY FACILITIES	1.00	JOB	157,819	9,469	16,729	920	184,938	184937.62
3300.15.08 SIGNS, BARRICADES	1.00	JOB	100,662	6,040	10,670	587	117,958	117958.21
3300.15.92 SURVEYS	1.00	JOB	12,000	720	1,272	70	14,062	14061.96
3300.15.97 MEETINGS	1.00	EA	13,973	838	1,481	81	16,374	16373.70
TOTAL MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	341,477	20,489	36,197	1,991	400,153	400152.58
Scope Contingency	10.00	%					40,015	
SUBTOTAL							440,168	
Bid Contingency	5.00	%					22,008	
TOTAL INCL OWNER COSTS							462,176	
3300.20 TREATMENT SYSTEM CONSTRUCTION								
3300.20.01 TREATMENT PLANT BUILDING	1.00	JOB	323,704	19,422	34,313	1,887	379,326	379325.64
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	1,923,254	115,395	203,865	11,213	2,253,727	2253726.65
3300.20.07 WELL INSTRUMENTS/CONTROLS	1.00	JOB	45,426	2,726	4,815	265	53,231	53231.06
3300.20.10 INSTALL WELLS	1.00	JOB	2,556,849	153,411	271,026	14,906	2,996,193	2996192.86
3300.20.15 PIPING	1.00	JOB	300,235	18,014	31,825	1,750	351,825	351824.77
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	5,149,468	308,968	545,844	30,021	6,034,301	6034300.97
Scope Contingency	10.00	%					603,430	
SUBTOTAL							6,637,731	
Bid Contingency	10.00	%					663,773	
TOTAL INCL OWNER COSTS							7,301,504	
3300.25 START UP, TESTING, O&M PLAN								

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3300.25. 5 O&M MANUAL	1.00	JOB	46,398	2,784	4,918	271	54,371	54371.08
3300.25.10 STARTUP/COMMISSION TREATMENT SYS	1.00	JOB	273,703	16,422	29,013	1,596	320,734	320733.62
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	320,102	19,206	33,931	1,866	375,105	375104.71
Scope Contingency	10.00	%					37,510	
SUBTOTAL							412,615	
Bid Contingency	10.00	%					41,262	
TOTAL INCL OWNER COSTS							453,877	
3300.30 DEMOBILIZATION								
3300.30.21 DEMOBILIZATION	1.00	JOB	6,071	364	644	35	7,114	7114.39
3300.30.22 REPORTS, CLOSEOUT	1.00	JOB	26,202	1,572	2,777	153	30,705	30704.76
TOTAL DEMOBILIZATION	1.00	JOB	32,274	1,936	3,421	188	37,819	37819.15
Scope Contingency	10.00	%					3,782	
SUBTOTAL							41,601	
Bid Contingency	10.00	%					4,160	
TOTAL INCL OWNER COSTS							45,761	
3400 1ST YEAR O&M								
3400. 5 GENERAL CONDITIONS								
3400. 5.05 OFFSITE ADMINISTRATIVE COSTS	1.00	MO	83,612	5,017	8,863	487	97,979	97979.05
TOTAL GENERAL CONDITIONS	12.00	MO	83,612	5,017	8,863	487	97,979	8164.92
Scope Contingency	5.00	%					4,899	
SUBTOTAL							102,878	
Bid Contingency	10.00	%					10,288	
TOTAL INCL OWNER COSTS							113,166	
3400.10 SITE FACILITIES/SECURITY	12.00	MO	198,370	11,902	21,027	1,156	232,456	19371.33
Scope Contingency	5.00	%					11,623	
SUBTOTAL							244,079	
Bid Contingency	5.00	%					12,204	
TOTAL INCL OWNER COSTS							256,283	
3400.15 HEALTH & SAFETY	12.00	MO	12,000	720	1,272	70	14,062	1171.83

		QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
	Scope Contingency	5.00 %					703	
	SUBTOTAL						14,765	
	Bid Contingency	5.00 %					738	
	TOTAL INCL OWNER COSTS						15,503	
3400.20	MATERIALS & SUPPLIES	12.00 MO	4,080	245	432	24	4,781	398.42
	Scope Contingency	10.00 %					478	
	SUBTOTAL						5,259	
	Bid Contingency	10.00 %					526	
	TOTAL INCL OWNER COSTS						5,785	
3400.25	MAINTENANCE	12.00 MO	64,000	3,840	6,784	373	74,997	6249.76
	Scope Contingency	10.00 %					7,500	
	SUBTOTAL						82,497	
	Bid Contingency	10.00 %					8,250	
	TOTAL INCL OWNER COSTS						90,747	
3400.30	UTILITIES	12.00 MO	88,800	5,328	9,413	518	104,059	8671.54
	Scope Contingency	10.00 %					10,406	
	SUBTOTAL						114,464	
	Bid Contingency	10.00 %					11,446	
	TOTAL INCL OWNER COSTS						125,911	
3400.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	257,146	15,429	27,257	1,499	301,331	25110.91
	Scope Contingency	10.00 %					30,133	
	SUBTOTAL						331,464	
	Bid Contingency	10.00 %					33,146	
	TOTAL INCL OWNER COSTS						364,610	
3400.40	CHEMICALS	12.00 MO	25,045	1,503	2,655	146	29,349	2445.74
	Scope Contingency	10.00 %					2,935	
	SUBTOTAL						32,284	
	Bid Contingency	10.00 %					3,228	
	TOTAL INCL OWNER COSTS						35,512	
3400.45	DISPOSALS							
3400.45. 5	SLUDGE	12.00 MO	6,746	405	715	39	7,905	658.76

	QUANTY UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
3400.45.15 CARBON (GAC, LIQUID PHASE)	12.00 MO	8,775	526	930	51	10,282	856.85
3400.45.20 PPE & MISC	12.00 MO	2,000	120	212	12	2,344	195.31
3400.45.25 OILY WASTE	12.00 MO	17,170	1,030	1,820	100	20,120	1676.69
TOTAL DISPOSALS	12.00 MO	34,691	2,081	3,677	202	40,651	3387.61
Scope Contingency	10.00 %					4,065	
SUBTOTAL						44,717	
Bid Contingency	10.00 %					4,472	
TOTAL INCL OWNER COSTS						49,188	
3400.50 SAMPLING & ANALYSIS							
3400.50. 5 PERFORMANCE MONITORING	1.00 MO	77,115	4,627	8,174	450	90,365	90365.41
3400.50.10 COMPLIANCE MONITORING	12.00 MO	195,546	11,733	20,728	1,140	229,146	19095.54
TOTAL SAMPLING & ANALYSIS	12.00 MO	272,661	16,360	28,902	1,590	319,512	26625.99
Scope Contingency	10.00 %					31,951	
SUBTOTAL						351,463	
Bid Contingency	10.00 %					35,146	
TOTAL INCL OWNER COSTS						386,609	
3400.55 QC & ANALYTICAL DATA VALIDATION							
3400.55. 5 DATA VALIDATION	1.00 MO	48,708	2,922	5,163	284	57,077	57077.50
TOTAL QC & ANALYTICAL DATA VALIDATION	12.00 MO	48,708	2,922	5,163	284	57,077	4756.46
Scope Contingency	10.00 %					5,708	
SUBTOTAL						62,785	
Bid Contingency	10.00 %					6,279	
TOTAL INCL OWNER COSTS						69,064	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST
AA Prime Contractor								
PL Mechanical Subcontractor	1.00	EA	178,553	3,257	99,507	20,000	0	301,317
PV Paving Subcontractor	1.00	EA	9,608	3,492	2,216	0	0	15,316
EL Electrical Contractor	1.00	EA	20,506	88	11,215	0	0	31,808
Subtotal Subcontract Work	1.00	EA	208,667	6,837	112,938	20,000	0	348,442
Subcontracts Incl Indirect	1.00	EA	267,923	8,778	145,010	25,680	0	447,390
Contractor's Own Work	1.00	EA	2,579,683	226,524	1,861,852	3,494,586	296,813	8,459,458
AA Prime Contractor	1.00	EA	2,847,606	235,303	2,006,862	3,520,265	296,813	8,906,848

** CONTRACTOR INDIRECT SUMMARY **

	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
AA Prime Contractor						
PL Mechanical Subcontractor	301,317	45,198	34,651	5,717	386,883	386883.37
PV Paving Subcontractor	15,316	2,297	1,761	291	19,666	19665.68
EL Electrical Contractor	31,808	4,771	3,658	604	40,841	40841.28
Subtotal Subcontract Work	348,442	52,266	40,071	6,612	447,390	447390.33
Indirect on Subcontracts	447,390	26,843	47,423	2,608	524,265	524265.41
Indirect on Own Work	8,459,458	507,567	896,703	49,319	9,913,046	9913046.21
AA Prime Contractor	8,906,848	534,411	944,126	51,927	10,437,312	10437311.63

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300. CAPITAL COSTS								
3300.05. GENERAL CONDITIONS								
3300.05.01. FIELD SUPERVISION & MANAGEMENT Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Engineer/Scientist IV, Site Engineer/QC	2000.00 HR	43.47 86,940	0.00 0	0.00 0	0.00 0	0.00 0	43.47 86,940	43.47
USR AA Senior Engineer/Scientist II - Site Superintendant	2400.00 HR	53.13 127,512	0.00 0	0.00 0	0.00 0	0.00 0	53.13 127,512	53.13
USR AA Secretary/Clerical IV	2000.00 HR	28.18 56,350	0.00 0	0.00 0	0.00 0	0.00 0	28.18 56,350	28.18
USR AA Engineer/Scientist III, Health & Safety Officer (HSO)	2400.00 HR	37.03 88,872	0.00 0	0.00 0	0.00 0	0.00 0	37.03 88,872	37.03
USR AA Engineer/Scientist IV, Electrical QC	100.00 HR	59.40 5,940	0.00 0	0.00 0	0.00 0	0.00 0	59.40 5,940	59.40
USR AA Engineer/Scientist IV, Mechanical QC	100.00 HR	59.40 5,940	0.00 0	0.00 0	0.00 0	0.00 0	59.40 5,940	59.40
MIL AA General Foreman	2000.00 HR	38.89 77,780	0.00 0	0.00 0	0.00 0	0.00 0	38.89 77,780	38.89
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-PKUP REF. EP 1110-1-8 4X2 3/4-TON PICK-UP, 8600 GVW Three pickups; one for each Super and one for SHO.	4800.00 HR	0.00 0	5.50 26,400	0.00 0	0.00 0	0.00 0	5.50 26,400	5.50
USR AA Lodging; Assume 3 people at site on per diem. One trip home every three weeks.	988.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	80.00 79,040	80.00 79,040	80.00
USR AA M&IE	988.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	23.10 22,823	23.10 22,823	23.10
USR AA Airfare	51.00 EA	0.00 0	0.00 0	0.00 0	0.00 0	500.00 25,500	500.00 25,500	500.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	100.00 EA	0	0	0	0	1,200	1,200	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	51.00 EA	0	0	0	0	510	510	10.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	4000.00 MI	0	0	0	0	1,400	1,400	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	449,334	26,400	0	0	130,473	606,206	606206.40
3300.05.02. ADMINISTRATION HOME OFFICE								
Scheduler, also serves in cost control. Average 20 hrs/wk.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	60.00 HR	6,204	0	0	0	0	6,204	103.40
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	1800.00 HR	164,340	0	0	0	0	164,340	91.30
Project Manager; Average of 100 hours/month for 18 total months for Plans prep, field construction and startup period.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Project Engineer	600.00 HR	62,040	0	0	0	0	62,040	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	200.00 HR	7,700	0	0	0	0	7,700	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler ; 1st 4 months fro m	346.00 HR	20,552	0	0	0	0	20,552	59.40
NTP in office working 1/2 time.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	240.00 HR	24,816	0	0	0	0	24,816	103.40
Health and Safety Manager								
USR AA Medical Consultant		0.00	0.00	0.00	100.00	0.00	100.00	
	40.00 HR	0	0	0	4,000	0	4,000	100.00
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M gr	64.00 HR	6,618	0	0	0	0	6,618	103.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	14000 MI	0	0	0	0	4,900	4,900	0.35

3300.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Lodging			0.00	0.00	0.00	0.00	80.00	80.00	
	44.00	DAY	0	0	0	0	3,520	3,520	80.00
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	88.00	DAY	0	0	0	0	3,344	3,344	38.00
USR AA Airfare Trips for HSM, QCSyst ems Mngr,	20.00	EA	0.00 0	0.00 0	0.00 0	0.00 0	500.00 10,000	500.00 10,000	500.00
USR AA Rental Car HSM visits monthly and 4 visits by QC Systems Mgr.	40.00	DAY	0.00 0	0.00 0	0.00 0	0.00 0	45.00 1,800	45.00 1,800	45.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	86.00	EA	0	0	0	0	1,032	1,032	12.00
USR AA Parking Airports			0.00	0.00	0.00	0.00	10.00	10.00	
	20.00	EA	0	0	0	0	200	200	10.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	292,270	0	0	4,000	24,796	321,066	321066.00
3300.05.03. PURCHASING									
USR AA Senior Engineer/Scientist II Purchaser	800.00	HR	72.60 58,080	0.00 0	0.00 0	0.00 0	0.00 0	72.60 58,080	72.60
USR AA Secretary/Clerical IV Home office Secretarial Help	80.00	HR	38.50 3,080	0.00 0	0.00 0	0.00 0	0.00 0	38.50 3,080	38.50
TOTAL PURCHASING	1.00	JOB	61,160	0	0	0	0	61,160	61160.00
3300.05.06. FIRST AID, FIRE, TRAFFIC, SECUR									
USR AA Security Guard Service 24 hr/ day Working Days	8760.00	HR	0.00 0	0.00 0	0.00 0	15.00 131,400	0.00 0	15.00 131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S t	10.00	EA	56.01 560	0.49 5	58.74 587	0.00 0	0.00 0	115.24 1,152	115.24
HTW AA Emergency Body Shower Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00	EA	145.11 145	1.22 1	122.86 123	0.00 0	0.00 0	269.19 269	269.19

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Eye Wash Bowl		126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00 EA	127	1	165	0	0	293	293.21
HTW AA First Aid Kit		0.00	0.00	75.00	0.00	0.00	75.00	
	8.00 EA	0	0	600	0	0	600	75.00
USR AA Stretcher		0.00	0.00	150.00	0.00	0.00	150.00	
	1.00 EA	0	0	150	0	0	150	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	832	7	1,625	131,400	0	133,865	133864.77
3300.05.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	20.00 DAY	0	0	820	0	0	820	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	40.00 DAY	0	0	480	0	0	480	12.00
USR AA Install/Decon Personnel Decon		769.80	3.39	500.00	0.00	0.00	1273.19	
Area	1.00 LS	770	3	500	0	0	1,273	1273.19
USR AA Install/Decon Equip Decon Are		384.90	1.70	1000.00	0.00	0.00	1386.59	
a	1.00 LS	385	2	1,000	0	0	1,387	1386.59
USR AA Heat Stress Monitoring Equipm		0.00	0.00	400.00	0.00	0.00	400.00	
ent	1.00 LS	0	0	400	0	0	400	400.00
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	12.00 MO	0	4,200	0	0	0	4,200	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	12.00 MO	0	5,100	0	0	0	5,100	425.00
USR AA Labor Allowance for Site		120.00	0.00	0.00	0.00	0.00	120.00	
Specific Training	60.00 EA	7,200	0	0	0	0	7,200	120.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	20.00 EA	4,000	0	0	0	0	4,000	200.00
USR AA Physicals; Med Surveillance, in & out.		0.00	0.00	0.00	500.00	0.00	500.00	
	20.00 LS	0	0	0	10,000	0	10,000	500.00
TOTAL HEALTH & SAFETY	1.00 JOB	12,355	18,905	3,900	10,000	0	45,160	45159.78
3300.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	0.00	0.00	35.00	35.00	
	12.00 MO	0	0	0	0	420	420	35.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	12.00 MO	0	0	0	0	900	900	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	12.00 MO	0	0	0	0	2,400	2,400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	12.00 MO	0	0	0	0	2,400	2,400	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	24.00 MO	0	0	0	0	2,040	2,040	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	12.00 MO	0	0	4,800	0	0	4,800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	12.00 MO	0	4,800	0	0	0	4,800	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	15.00 MO	0	4,500	0	0	0	4,500	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 MO	0	0	0	0	600	600	50.00
USR AA Shower/Lunch Trailer		0.00	650.00	0.00	0.00	0.00	650.00	
	12.00 MO	0	7,800	0	0	0	7,800	650.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	2.00 EA	0	6,000	0	0	0	6,000	3000.00

3300.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Laborer for Daily Cleaning		38.39	0.00	0.00	0.00	0.00	38.39	
	2240.00 HR	85,993	0	0	0	0	85,993	38.39
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	85,993	29,100	4,800	0	13,560	133,453	133453.15
3300.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	12.00 MO	0	0	0	0	8,400	8,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	12.00 MO	0	0	0	0	5,400	5,400	450.00
USR AA Water		0.00	0.00	0.00	0.00	100.00	100.00	
	12.00 MO	0	0	0	0	1,200	1,200	100.00
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	0	15,000	15,000	15000.00
TOTAL GENERAL CONDITIONS	1.00 JOB	901,944	74,412	10,325	145,400	183,829	1,315,910	1315910.11

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10. SUBMITTALS/IMPLEMENTATION PLANS								
3300.10.01. Construction Work Plan								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	2.00 HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Response to Comments	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	8.00 HR	730	0	0	0	0	730	91.30
Project Manager								
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
TOTAL Construction Work Plan	1.00 EA	8,276	0	0	100	1,200	9,576	9576.40
3300.10.02. Contractors QC Management Plan								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	8.00 HR	730	0	0	0	0	730	91.30
Project Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	48.00 HR	2,851	0	0	0	0	2,851	59.40
USR AA Engineer/Scientist IV; Respon		59.40	0.00	0.00	0.00	0.00	59.40	
se	20.00 HR	1,188	0	0	0	0	1,188	59.40
to Comments								

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors QC Management Pla	1.00 EA	6,732	0	0	100	1,200	8,032	8032.00

3300.10.03. Contractors Chem Quality Control
Includes Contractors CQCMP, SAP, FSP, QAPP, Groundwater SAP, Process Liquid SAP.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	80.00 HR	6,776	0	0	0	0	6,776	84.70
USR AA Senior Engineer/Scientist IV; Response to Comments		84.70	0.00	0.00	0.00	0.00	84.70	
	32.00 HR	2,710	0	0	0	0	2,710	84.70
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	8.00 HR	730	0	0	0	0	730	91.30
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors Chem Quality Cont	1.00 EA	11,880	0	0	100	1,200	13,180	13180.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10.05. Regulatory Compliance Plan/Updat								
This work includes developing plan, quarterly updates to the plan for 8 quarters, and submitting permit/permit equivalency applications to all relevant federal, state and local agencies.								
Permits (equivalencies) building, excavation, utility crossings, well, air emissions, Erosion Control, Stormwater, Electrical, and NDPES. Local permits are anticipated.								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	120.00 HR	10,164	0	0	0	0	10,164	84.70
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	200.00 HR	11,880	0	0	0	0	11,880	59.40
USR AA Engineer/Scientist IV; Respon se to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	200.00 HR	11,880	0	0	0	0	11,880	59.40
USR AA Permit Charges Allowance		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.30	0.30	
	880.00 MI	0	0	0	0	264	264	0.30
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	40.00 HR	3,652	0	0	0	0	3,652	91.30
TOTAL Regulatory Compliance Plan/Up	1.00 EA	39,886	0	0	100	2,632	42,618	42618.00
3300.10.06. Traffic Routing Plan								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	8.00 HR	475	0	0	0	0	475	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	2.00 HR	119	0	0	0	0	119	59.40

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; Project Manager			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	1.00	HR	39	0	0	0	0	39	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	10.00	10.00	
	24.00	EA	0	0	0	0	240	240	10.00
USR AA Mail			0.00	0.00	0.00	5.00	0.00	5.00	
	1.00	EA	0	0	0	5	0	5	5.00
TOTAL Traffic Routing Plan	1.00	EA	839	0	0	5	240	1,084	1084.30
3300.10.07. Site Health and Safety Plan Includes Air Monitoring Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	80.00	HR	4,752	0	0	0	0	4,752	59.40
USR AA Engineer/Scientist IV; Respond to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	32.00	HR	1,901	0	0	0	0	1,901	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	8.00	HR	537	0	0	0	0	537	67.10
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Principal Engineer/Scientist I; Project Manager			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
TOTAL Site Health and Safety Plan	1.00	EA	10,384	0	0	100	600	11,084	11084.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.10.15. Performance Testing Plan								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist I; Respond to Comments		67.10	0.00	0.00	0.00	0.00	67.10	
	8.00 HR	537	0	0	0	0	537	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	4.00 HR	365	0	0	0	0	365	91.30
USR AA Contractors Chem Quality Control Officer		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Performance Testing Plan	1.00 EA	6,604	0	0	50	1,200	7,854	7854.40
3300.10.41. Subcontracting Plan								
USR AA Principal Engineer/Scientist I; Project Manager		103.40	0.00	0.00	0.00	0.00	103.40	
	4.00 HR	414	0	0	0	0	414	103.40
USR AA Principal Engineer/Scientist I; Respond to Comments		103.40	0.00	0.00	0.00	0.00	103.40	
	4.00 HR	414	0	0	0	0	414	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA Senior Engineer/Scientist II; Site Superintendant		72.60	0.00	0.00	0.00	0.00	72.60	
	8.00 HR	581	0	0	0	0	581	72.60
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Subcontracting Plan	1.00 EA	1,562	0	0	50	1,200	2,812	2812.00
3300.10.42. Environmental Protection Plan								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	8.00 HR	537	0	0	0	0	537	67.10
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	4.00 HR	365	0	0	0	0	365	91.30
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Environmental Protection Plan	1.00 EA	2,398	0	0	100	1,200	3,698	3698.00
3300.10.43. Correct/Emerg Conting Action Pln								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	4.00 HR	268	0	0	0	0	268	67.10

3300.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	2.00 HR	183	0	0	0	0	183	91.30
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Correct/Emerg Conting Action	1.00 EA	1,947	0	0	100	1,200	3,247	3247.00
TOTAL SUBMITTALS/IMPLEMENTATION PLA	1.00 JOB	90,509	0	0	805	11,872	103,186	103186.10

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.12. ENGINEERING								
3300.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, and gas lines, drainage, roads and parking.								
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	100.00 HR	7,920	0	0	0	0	7,920	79.20
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	600.00 HR	25,080	0	0	0	0	25,080	41.80
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	80.00 HR	2,640	0	0	0	0	2,640	33.00
USR AA Draftsman/CAD		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
USR AA ODC's		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	100.00 EA	0	0	0	300	0	300	3.00
USR AA Surveying		633.60	0.00	100.00	1000.00	0.00	1733.60	
	20.00 DAY	12,672	0	2,000	20,000	0	34,672	1733.60
TOTAL COMPLETION DESIGN - CIVIL	1.00 JOB	93,632	0	2,000	20,300	1,000	116,932	116932.00
3300.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	400.00 HR	41,360	0	0	0	0	41,360	103.40

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	1000.00 HR	41,800	0	0	0	0	41,800	41.80
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	1000.00 HR	84,700	0	0	0	0	84,700	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	800.00 HR	38,720	0	0	0	0	38,720	48.40
USR AA Draftsman/CAD		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	2000.00 EA	0	0	0	6,000	0	6,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00 JOB	230,340	0	0	6,000	10,000	246,340	246340.00

3300.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II; Electrical Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Principal Engineer/Scientist I; Electrical Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	400.00 HR	36,520	0	0	0	0	36,520	91.30
USR AA Senior Engineer/Scientist II; Instrument Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	600.00 HR	43,560	0	0	0	0	43,560	72.60
USR AA Draftsman/CAD		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00 JOB	132,880	0	0	0	5,000	137,880	137880.00

3300.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.12.26. PCS PROGRAMMING - GROUNDWATER								
3300.12.26.15. PC PROGRAMMING Process Control programming of PLC/PCS.								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	360.00 HR	32,868	0	0	0	0	32,868	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	24.00 HR	924	0	0	0	0	924	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00
TOTAL PC PROGRAMMING	1.00 JOB	33,792	0	0	0	1,000	34,792	34792.00
3300.12.26.20. MMI PROGRAMMING Program man-machine interface, control panels, displays.								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL MMI PROGRAMMING	1.00 JOB	18,876	0	0	0	500	19,376	19376.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00 JOB	52,668	0	0	0	1,500	54,168	54168.00
TOTAL ENGINEERING	1.00 JOB	509,520	0	2,000	26,300	17,500	555,320	555320.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15. MOBE, SITE WORK, TEMP FACILITIES								
3300.15.01. CLEAR SITE BRUSH								
L AIR AA Clearing - Medium Brush w/o G		414.45	202.98	0.00	0.00	0.00	617.43	
rub	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
TOTAL CLEAR SITE BRUSH	1.00 ACR	12,434	6,089	0	0	0	18,523	18522.85
3300.15.02. MOBE EQUIP & FACILITIES								
USR AA Mobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,000	1,000	200.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	4.00 EA	0	0	0	2,400	0	2,400	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA COE Software, Primavera		0.00	0.00	2400.00	0.00	0.00	2400.00	
Suretrack	1.00 EA	0	0	2,400	0	0	2,400	2400.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	8000.00	0.00	8000.00	
	1.00 EA	0	0	0	8,000	0	8,000	8000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	8000.00	0.00	8000.00	
	1.00 EA	0	0	0	8,000	0	8,000	8000.00
USR AA Temp Sewer Hookup		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 EA	0	0	0	4,000	0	4,000	4000.00
TOTAL MOBE EQUIP & FACILITIES	1.00 JOB	0	0	15,100	22,400	1,000	38,500	38500.00
3300.15.05. TEMPORARY FACILITIES								
3300.15.05.05. ROUGH GRADE SITE								
L MIL AA Cut and Grade Embankment Slop		763.16	264.32	0.00	0.00	0.00	1027.48	
es	1.00 ACR	763	264	0	0	0	1,027	1027.48
Ditch to 3'(1M), Slopes to 1V/2H Slopes To 1V/2H								
TOTAL ROUGH GRADE SITE	1.00 JOB	763	264	0	0	0	1,027	1027.48

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.05.20. TEMPORARY PAVING								
Paving at site offices and equipment building.								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
M MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	45.00	0.00	0.00	180.94	
se	13.00 TON	1,800	469	751	0	0	3,020	232.32
3954#/CY (2349Kg/M3),Ctrl Plant								
M MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	45.00	0.00	0.00	180.94	
e	13.00 TON	1,800	469	751	0	0	3,020	232.32
3774#/CY (2242Kg/M3),Ctrl Plant								
M CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	1.00	0.00	0.00	3.30	
Coal Tar Emulsion	120.00 SY	251	104	154	0	0	509	4.24
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL TEMPORARY PAVING		6,168	2,242	1,880	0	0	10,291	
3300.15.05.25. WATER LINE								
Water line for site offices and for required process water.								
M MIL PL 4" (10cm) Galv Steel Pipe		23.72	0.24	8.00	0.00	0.00	31.96	
ASTM A-53, T&C, Sch 40	1000.00 LF	30,450	307	10,272	0	0	41,030	41.03
M MIL PL 4" 90 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4" 45 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4"Coupling,Straight 150# MI G		52.37	0.53	60.00	0.00	0.00	112.90	
alv	10.00 EA	672	7	770	0	0	1,450	144.96
M MIL PL 4"Nipple,Galv Stl Sch 40, 4"		17.96	0.18	20.00	0.00	0.00	38.14	
4"(10cm) Long	10.00 EA	231	2	257	0	0	490	48.97
M MIL PL 4" Iron Body Gate Valve, Thrd		84.65	0.71	800.00	0.00	0.00	885.36	
125# Bronze Mtd w/Threaded Va	1.00 EA	109	1	1,027	0	0	1,137	1136.78
lve								

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 4"IB Swing Ck Vlv,Brz,Flg&125 #	1.00 EA	195.19 251	1.79 2	400.00 514	0.00 0	0.00 0	596.98 767	766.50
M MIL PL 4" Flanged Backflow Preventer w/2Gate&2CK Vlv&Auto Dif Rlf Vlv	1.00 EA	183.48 236	1.68 2	3000.00 3,852	0.00 0	0.00 0	3185.16 4,090	4089.66
USR PL Piping Bend Thrust Blocks	10.00 EA	22.50 289	0.39 5	8.00 103	0.00 0	0.00 0	30.89 397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pipe	1.00 EA	634.86 815	5.65 7	0.00 0	0.00 0	0.00 0	640.51 822	822.40
MIL PL Underground Marking Tape,6"Wide (15cm)	1000.00 LF	0.29 367	0.00 1	0.04 51	0.00 0	0.00 0	0.33 420	0.42
USR PL Chlorinate Water Line	1.00 JOB	126.97 163	1.07 1	50.00 64	0.00 0	0.00 0	178.04 229	228.60
MIL PL 4" Standard Fire Hydrant One Piece w/5'(1.5M)Burial Secti	2.00 EA	359.13 922	3.62 9	927.18 2,381	0.00 0	0.00 0	1289.93 3,312	1656.24
MIL PL Trench 1/2 CY Hyd Exc, Hvy Soil 51 CY/Hr (40M3)/Hr	300.00 CY	1.88 724	0.83 320	0.00 0	0.00 0	0.00 0	2.71 1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loader Without Compaction	390.00 CY	1.09 545	0.46 229	0.00 0	0.00 0	0.00 0	1.55 774	1.99
MIL PL Compaction, 6" Layers, Vib Plate (15cm) Layers	390.00 CY	2.86 1,430	0.07 33	0.00 0	0.00 0	0.00 0	2.92 1,463	3.75
TOTAL WATER LINE		38,549	942	21,474	0	0	60,965	
3300.15.05.30. PHONE								
USR AA Install Telephone Service	1.00 LS	0.00 0	0.00 0	0.00 0	2000.00 2,000	0.00 0	2000.00 2,000	2000.00
TOTAL PHONE		0	0	0	2,000	0	2,000	

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.05.35. SEWER								
8" sewer, manholes and cleanouts								
USR AA Allow for San Sewer to Street		0.00	0.00	0.00	50.00	0.00	50.00	
	800.00 LFT	0	0	0	40,000	0	40,000	50.00
MIL AA Demo Bituminous Roads		3.63	0.69	0.00	0.00	0.00	4.32	
Remove Paving and Base Course	100.00 SY	363	69	0	0	0	432	4.32
MIL AA Saw Cut Bituminous Paving		0.88	0.03	0.00	0.00	0.00	0.91	
Per Linear Inch of Depth	400.00 LF	354	11	0	0	0	365	0.91
USR AA Dump Truck and Driver		0.00	0.00	0.00	50.00	0.00	50.00	
	8.00 HR	0	0	0	400	0	400	50.00
USR AA Disposal of Asphalt Rubble		0.00	0.00	0.00	65.00	0.00	65.00	
	20.00 TON	0	0	0	1,300	0	1,300	65.00
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25
TOTAL SEWER		720	81	0	67,380	0	68,181	
3300.15.05.40. ELECTRICAL SERVICE								
TOTAL ELECTRICAL SERVICE		0	0	0	0	0	0	
3300.15.05.45. GAS SERVICE								
TOTAL GAS SERVICE		0	0	0	0	0	0	
3300.15.05.50. SITE MAINT/CLEANUP								
MIL AA Outside Laborers, (Semi-Skill		38.39	0.00	0.00	0.00	0.00	38.39	
ed)	400.00 HR	15,356	0	0	0	0	15,356	38.39
TOTAL SITE MAINT/CLEANUP	1.00 JOB	15,356	0	0	0	0	15,356	15355.92
TOTAL TEMPORARY FACILITIES	1.00 JOB	61,557	3,529	23,354	69,380	0	157,819	157819.49
3300.15.08. SIGNS, BARRICADES								
3300.15.08. 5. SIGNS								
USR AA Jobsite Signs		0.00	0.00	0.00	1500.00	0.00	1500.00	
	1.00 LS	0	0	0	1,500	0	1,500	1500.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Hazard Warning Signs		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL SIGNS	1.00 EA	0	0	0	3,500	0	3,500	3500.00
3300.15.08.10. BARRICADES/TEMP FENCING								
CIV AA Stl Post, 10'OC f/4' Snow Fen		2.05	0.03	0.99	0.00	0.00	3.07	
ce	500.00 LF	1,027	13	495	0	0	1,534	3.07
TOTAL BARRICADES/TEMP FENCING	1.00 JOB	1,027	13	495	0	0	1,534	1534.20
3300.15.08.15. EROSION CONTROL								
Assume silt fence on downstream side of all trenches and building excavations.								
MIL AA Silt Fences, Vinyl, 3' High		2.05	0.01	1.22	0.00	0.00	3.28	
With 7.5' Posts	4000.00 LF	8,211	36	4,880	0	0	13,127	3.28
MIL AA TRENCHR,CHN, 24"DP,6"W,WLK-BE		0.00	2.08	0.00	0.00	0.00	2.08	
HND	90.00 HR	0	187	0	0	0	187	2.08
USR AA Silt Fence Removal		0.96	0.00	0.00	0.00	0.00	0.97	
	4000.00 LF	3,849	17	0	0	0	3,866	0.97
USR AA Silt Fence Disposal (Dumpster		0.00	0.00	0.00	0.00	0.25	0.25	
)	4000.00 LF	0	0	0	0	1,000	1,000	0.25
MIL AA Foreman		38.89	0.00	0.00	0.00	0.00	38.89	
	4.00 HR	156	0	0	0	0	156	38.89
USR AA Maintain Silt Fences		38.39	0.00	0.00	0.00	0.00	38.39	
	96.00 HR	3,685	0	0	0	0	3,685	38.39
USR AA Dump Truck and Driver		0.00	0.00	0.00	50.00	0.00	50.00	
	40.00 HR	0	0	0	2,000	0	2,000	50.00
TOTAL EROSION CONTROL	1.00 JOB	15,901	240	4,880	2,000	1,000	24,021	24020.82

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.08.20. STREET CLEANING								
MIL AA Skid Loader (Bobcat) w/Sweeper Attachment		0.00	17.93	0.00	0.00	0.00	17.93	
	350.00 HR	0	6,275	0	0	0	6,275	17.93
TOTAL STREET CLEANING	1.00 JOB	0	6,275	0	0	0	6,275	6274.52
3300.15.08.25. DUST CONTROL								
MIL AA Water Truck		0.00	0.00	0.00	50.00	0.00	50.00	
	1000.00 HR	0	0	0	50,000	0	50,000	50.00
TOTAL DUST CONTROL	1.00 JOB	0	0	0	50,000	0	50,000	50000.00
3300.15.08.30. STORMWATER CONTROL Drainage ditches on site and berms to control runoff.								
MIL AA Exc & Fill, D-4D Dozer w/S-Blade 75 HP, Move 150' and Stockpile		2.83	1.00	0.00	0.00	0.00	3.83	
	4000.00 CY	11,321	4,011	0	0	0	15,332	3.83
TOTAL STORMWATER CONTROL	1.00 JOB	11,321	4,011	0	0	0	15,332	15332.00
TOTAL SIGNS, BARRICADES	1.00 JOB	28,249	10,538	5,375	55,500	1,000	100,662	100661.54
3300.15.92. SURVEYS								
3300.15.92. 5. INITIAL LAYOUT SURVEY								
USR AA Survey Pipelines		0.00	0.00	0.00	1000.00	0.00	1000.00	
	2.00 DAY	0	0	0	2,000	0	2,000	1000.00
USR AA General Survey for Controls		0.00	0.00	0.00	1000.00	0.00	1000.00	
	2.00 DAY	0	0	0	2,000	0	2,000	1000.00
USR AA Survey Report and Plots		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
USR AA Facility Layout Survey		0.00	0.00	0.00	1000.00	0.00	1000.00	
	1.00 DAY	0	0	0	1,000	0	1,000	1000.00
TOTAL INITIAL LAYOUT SURVEY	1.00 JOB	0	0	0	7,000	0	7,000	7000.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.15.92.10. SURVEY CONTROLS								
Controls & QC check during construction								
USR AA Survey Crew, 3 man		0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00 DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL SURVEY CONTROLS	1.00 JOB	0	0	0	5,000	0	5,000	5000.00
TOTAL SURVEYS	1.00 JOB	0	0	0	12,000	0	12,000	12000.00
3300.15.97. MEETINGS								
3300.15.97.01. Preconstruction Meeting								
USR AA Senior Engineer/Scientist II - Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	16.00 HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist III; Lead Engineer		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	10.00 HR	913	0	0	0	0	913	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	400.00 MI	0	0	0	0	140	140	0.35
USR AA M&IE; 3 each for 1/2 day and 1 for full day =2.5 days		0.00	0.00	0.00	0.00	38.00	38.00	
	2.50 DAY	0	0	0	0	95	95	38.00
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 EA	0	0	0	0	500	500	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00
USR AA Lodging		0.00	0.00	0.00	0.00	80.00	80.00	
	1.00 DAY	0	0	0	0	80	80	80.00

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preconstruction Meeting	1.00 JOB	5,072	0	0	0	963	6,035	6034.88
3300.15.97.03. Coordination Meeting								
USR AA Senior Engineer/Scientist II - Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	16.00 HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist I; Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	16.00 HR	1,461	0	0	0	0	1,461	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Senior Engineer/Scientist IV; Project Chemist		84.70	0.00	0.00	0.00	0.00	84.70	
	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist III; Contractors CQC System M ana		103.40	0.00	0.00	0.00	0.00	103.40	
	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	400.00 MI	0	0	0	0	140	140	0.35
USR AA M&IE; 3 each for 1/2 day and 1 for full day =2.5 days		0.00	0.00	0.00	0.00	38.00	38.00	
	2.50 DAY	0	0	0	0	95	95	38.00
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 EA	0	0	0	0	500	500	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00
USR AA Lodging		0.00	0.00	0.00	0.00	80.00	80.00	
	1.00 DAY	0	0	0	0	80	80	80.00
TOTAL Coordination Meeting	1.00 JOB	6,975	0	0	0	963	7,938	7937.88

3300.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL MEETINGS	1.00	EA	12,047	0	0	0	1,926	13,973	13972.76
TOTAL MOBE, SITE WORK, TEMP FACILIT	1.00	JOB	114,286	20,156	43,829	159,280	3,926	341,477	341476.64

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20. TREATMENT SYSTEM CONSTRUCTION								
3300.20.01. TREATMENT PLANT BUILDING GW treatment plant housed in Metal building sized 100 ft x 60 ft. Assume air conditioned office to house computers and system controls equipment and operators. Building includes concrete slab.								
3300.20.01.07. TELEPHONE/COM DISTRIBUTION								
USR AA Allow for Telephone Wiring an		0.00	0.00	0.00	2000.00	0.00	2000.00	
d	1.00 LS	0	0	0	2,000	0	2,000	2000.00
Connections for Building								
TOTAL TELEPHONE/COM DISTRIBUTION	100.00 LF	0	0	0	2,000	0	2,000	20.00
3300.20.01.10. BUILDING								
USR AA Concrete		0.00	0.00	0.00	300.00	0.00	300.00	
	200.00 CY	0	0	0	60,000	0	60,000	300.00
USR AA Pre-Engineered Metal Building		0.00	0.00	35.00	0.00	0.00	35.00	
(100 X 60)	6000.00 SFT	0	0	210,000	0	0	210,000	35.00
MIL AA Structural Fill		5.09	1.76	19.79	0.00	0.00	26.64	
	200.00 CY	1,018	352	3,959	0	0	5,329	26.64
TOTAL BUILDING	2400.00 SFT	1,018	352	213,959	60,000	0	275,329	114.72
3300.20.01.15. GWTP OFFICE								
USR AA Finish Office, Insulation,		0.00	0.00	0.00	60.00	0.00	60.00	
Painting, Doors	400.00 SFT	0	0	0	24,000	0	24,000	60.00
TOTAL GWTP OFFICE	1.00 JOB	0	0	0	24,000	0	24,000	24000.00
3300.20.01.20. PAVING								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	17.68	0.00	0.00	153.61	
se	13.00 TON	1,800	469	295	0	0	2,564	197.23
3954#/CY (2349Kg/M3),Ctrl Plant								
MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	22.98	0.00	0.00	158.92	
e	13.00 TON	1,800	469	384	0	0	2,653	204.04
3774#/CY (2242Kg/M3),Ctrl Plant								

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	0.40	0.00	0.00	2.71	
Coal Tar Emulsion	120.00 SY	251	104	62	0	0	417	3.48
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL PAVING		6,168	2,242	965	0	0	9,375	
3300.20.01.25. FIRE ALARM SYSTEM								
USR AA Fire Alarm System		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
TOTAL FIRE ALARM SYSTEM	1.00 JOB	0	0	0	3,000	0	3,000	3000.00
3300.20.01.30. PLUMBING								
USR AA Plumbing		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL PLUMBING		0	0	0	10,000	0	10,000	
TOTAL TREATMENT PLANT BUILDING	1.00 JOB	7,186	2,595	214,924	99,000	0	323,704	323703.64
3300.20.05. TREATMENT SYSTEM EQUIP. F&I								
3300.20.05. 5. EXPEDITOR/QC EQUIP. FABRICATION								
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Startup/Proveout Project Mana ger	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Lodging		0.00	0.00	0.00	0.00	80.00	80.00	
	10.00 DAY	0	0	0	0	800	800	80.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	10.00 DAY	0	0	0	0	420	420	42.00
USR AA Airfare Trips		0.00	0.00	0.00	0.00	500.00	500.00	
	5.00 EA	0	0	0	0	2,500	2,500	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	10.00 DAY	0	0	0	0	450	450	45.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	5.00 EA	0	0	0	0	50	50	10.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00 JOB	9,504	0	0	0	4,220	13,724	13724.00
3300.20.05.01. EQUIP SUBMITTAL REVIEW								
USR AA Principal Engineer/Scientist III; Contractors CQC System M ana		103.40	0.00	0.00	0.00	0.00	103.40	
	140.00 HR	14,476	0	0	0	0	14,476	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	700.00 HR	41,580	0	0	0	0	41,580	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	40.00 HR	1,540	0	0	0	0	1,540	38.50
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00 EA	0	0	0	3,000	0	3,000	3.00
USR AA Mail		0.00	0.00	0.00	25.00	0.00	25.00	
	50.00 EA	0	0	0	1,250	0	1,250	25.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00 JOB	57,596	0	0	4,250	0	61,846	61846.00
3300.20.05.10. EQUIPMENT, PURCHASE & SHIPPING								
USR AA Oil/Water Separator		0.00	0.00	150000.00	0.00	0.00	150000.00	
	1.00 LS	0	0	150,000	0	0	150,000	150000.00
USR AA Bag Filter System		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Air Compressor		0.00	0.00	7000.00	0.00	0.00	7000.00	
	5.00 LS	0	0	35,000	0	0	35,000	7000.00
USR AA Sump Pump		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Bioreactor System		0.00	0.00	645000.00	0.00	0.00	645000.00	
	1.00 LS	0	0	645,000	0	0	645,000	645000.00
USR AA Final Filter Skid		0.00	0.00	15000.00	0.00	0.00	15000.00	
	1.00 LS	0	0	15,000	0	0	15,000	15000.00
USR AA Liquid Phase Carbon System		0.00	0.00	75000.00	0.00	0.00	75000.00	
	1.00 LS	0	0	75,000	0	0	75,000	75000.00
USR AA Freight		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Equalization Tank 40000 gal		0.00	0.00	50000.00	0.00	0.00	50000.00	
	1.00 LS	0	0	50,000	0	0	50,000	50000.00
USR AA Effluent Collection Tank 4000 0 gal		0.00	0.00	50000.00	0.00	0.00	50000.00	
	1.00 LS	0	0	50,000	0	0	50,000	50000.00
USR AA Freight		0.00	0.00	2800.00	0.00	0.00	2800.00	
	1.00 LS	0	0	2,800	0	0	2,800	2800.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
TOTAL EQUIPMENT, PURCHASE & SHIPPIN	1.00 JOB	0	0	1,063,800	0	0	1,063,800	1063800.00

3300.20.05.12. INSTRUMENTATION/CONTROLLERS

3300.20.05.12.05. PROCESS CONTROLLER EQUIPMENT

USR AA I/O and Cabinet		0.00	0.00	28000.00	0.00	0.00	28000.00	
	1.00 LS	0	0	28,000	0	0	28,000	28000.00
USR AA Software and Processors		0.00	0.00	18000.00	0.00	0.00	18000.00	
	1.00 LS	0	0	18,000	0	0	18,000	18000.00
USR AA Autodailer		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL PROCESS CONTROLLER EQUIPMENT	1.00 JOB	0	0	47,000	0	0	47,000	47000.00

3300.20.05.12.10. WELL INSTRUMENTS

Instruments for E Zone wells only here. The pneumatic pumps in all other zones have instrumentation included in their pricing in the INSTALL WELLS section.

USR AA Flowmeters, Pressure Indicato rs, Level Controllers, & Misc.		126.97	1.13	4500.00	0.00	0.00	4628.10	
	2.00 EA	254	2	9,000	0	0	9,256	4628.10
TOTAL WELL INSTRUMENTS	1.00 JOB	254	2	9,000	0	0	9,256	9256.20

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.05.12.15. INSTRUMENT ENGINEERING/PROGRAM								
USR AA Principal Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Instrument Engineer	120.00 HR	10,956	0	0	0	0	10,956	91.30
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	16.00 HR	1,162	0	0	0	0	1,162	72.60
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	200.00 HR	14,520	0	0	0	0	14,520	72.60
TOTAL INSTRUMENT ENGINEERING/PROGRA	1.00 JOB	26,638	0	0	0	0	26,638	26637.60
TOTAL INSTRUMENTATION/CONTROLLERS	1.00 JOB	26,892	2	56,000	0	0	82,894	82893.80
3300.20.05.13. COMPUTER								
USR AA Computer		0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00 EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software		0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00 EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support		0.00	0.00	0.00	450.00	0.00	450.00	
Plan	1.00 YR	0	0	0	450	0	450	450.00
USR AA Software Training		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	40.00 HR	3,168	0	0	0	0	3,168	79.20
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL COMPUTER	1.00 JOB	8,448	0	5,300	4,450	0	18,198	18198.00
3300.20.05.15. EQUIPMENT INSTALLATION								
USR AA Crane Rental		0.00	0.00	0.00	6000.00	0.00	6000.00	
	4.00 WK	0	0	0	24,000	0	24,000	6000.00
USR AA Materials/Grout/Misc		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 JOB	0	0	500	0	0	500	500.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL AA Millwrights		47.87	0.00	0.00	0.00	0.00	47.87	
	400.00 HR	19,149	0	0	0	0	19,149	47.87
MIL AA Eq Oper, Medium		56.51	0.00	0.00	0.00	0.00	56.51	
	800.00 HR	45,204	0	0	0	0	45,204	56.51
MIL AA Laborer (Semi-Skilled)		38.39	0.00	0.00	0.00	0.00	38.39	
	3200.00 HR	122,847	0	0	0	0	122,847	38.39
MIL AA GENERATOR, 5.0 KW, 120/240V,P ORT		0.00	1.92	0.00	0.00	0.00	1.92	
	800.00 HR	0	1,539	0	0	0	1,539	1.92
UPB AA FORK LIFT,R/T 8,000#,16.00'L -HT		0.00	11.94	0.00	0.00	0.00	11.94	
	800.00 HR	0	9,553	0	0	0	9,553	11.94
TOTAL EQUIPMENT INSTALLATION	1.00 JOB	187,201	11,091	500	24,000	0	222,792	222792.12
3300.20.05.16. TREATMENT SYSTEM ELECTRICAL & IN								
USR AA Electrical Sub		0.00	0.00	0.00	210000.00	0.00	210000.00	
	1.00 LS	0	0	0	210,000	0	210,000	210000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00 JOB	0	0	0	210,000	0	210,000	210000.00
3300.20.05.17. MECHANICAL								
USR AA F&I Process Piping, Valves, Instruments, HVAC		0.00	0.00	0.00	250000.00	0.00	250000.00	
	1.00 LS	0	0	0	250,000	0	250,000	250000.00
TOTAL MECHANICAL	1.00 JOB	0	0	0	250,000	0	250,000	250000.00
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00 JOB	289,640	11,094	1,125,600	492,700	4,220	1,923,254	1923253.92

3300.20.07. WELL INSTRUMENTS/CONTROLS

This well instrumentation wiring and power are for the E Zone wells only.
The pneumatic pumps controls and air lines are in the piping and install
wells areas of this estimate.

3300.20.07.10. INSTRUMENT CABLE TO WELLHEADS

MIL EL 6" Stl Cable Tray-Strt Sect,1 2' (15cm)w/ hangers & Supports		6.73	0.03	5.91	0.00	0.00	12.67	
	1000.00 LF	6,647	35	7,586	0	0	16,267	16.27

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR EL Signal Wire		60.05	0.24	20.00	0.00	0.00	80.29	
	50.00 KLF	3,855	15	1,284	0	0	5,154	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00 JOB	12,502	50	8,870	0	0	21,421	21421.45
3300.20.07.30. WELL INSTRUMENTATION								
USR AA Level Controller		63.49	0.57	600.00	0.00	0.00	664.05	
	2.00 EA	127	1	1,200	0	0	1,328	664.05
USR AA Water Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	2.00 EA	254	2	3,000	0	0	3,256	1628.10
TOTAL WELL INSTRUMENTATION	1.00 JOB	381	3	4,200	0	0	4,584	4584.31
3300.20.07.40. ELECTRICAL POWER TO WELLS								
AIR EL 1" R.S. Conduit w/Coupling &		4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	2000.00 LF	10,745	49	2,440	0	0	13,233	6.62
CIV EL 1/4" Nylon Pull Cord Installe		0.29	0.00	0.39	0.00	0.00	0.68	
d	4000.00 LF	1,480	6	1,987	0	0	3,473	0.87
Cable Installation Methods								
MIL EL No 12-Type THWN		159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	409	2	197	0	0	608	304.13
MIL EL No 8-Type THWN		264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	679	3	590	0	0	1,272	635.88
MIL EL No 10-Type THWN		200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	515	2	316	0	0	834	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00 JOB	13,828	62	5,530	0	0	19,420	19419.83
TOTAL WELL INSTRUMENTS/CONTROLS	1.00 JOB	26,710	116	18,600	0	0	45,426	45425.58

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. INSTALL WELLS								
3300.20.10. 5. EXTRACTION WELLS Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,								
3300.20.10. 5. 5. "A" ZONE WELLS								
USR AA Install Extraction Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	960.00 LFT	0	0	0	129,600	0	129,600	135.00
TOTAL "A" ZONE WELLS	16.00 EA	0	0	0	129,600	0	129,600	8100.00
3300.20.10. 5.10. "B" ZONE WELLS								
USR AA Install Extraction Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	1260.00 LFT	0	0	0	170,100	0	170,100	135.00
TOTAL "B" ZONE WELLS	12.00 EA	0	0	0	170,100	0	170,100	14175.00
3300.20.10. 5.15. "C" ZONE WELLS								
USR AA Install Extraction Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	1665.00 LFT	0	0	0	224,775	0	224,775	135.00
TOTAL "C" ZONE WELLS	9.00 EA	0	0	0	224,775	0	224,775	24975.00
3300.20.10. 5.20. "D" ZONE WELLS								
USR AA Install Extraction Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	1050.00 LFT	0	0	0	141,750	0	141,750	135.00
TOTAL "D" ZONE WELLS	5.00 EA	0	0	0	141,750	0	141,750	28350.00
3300.20.10. 5.25. "E" ZONE WELLS								
USR AA Install Extraction Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	540.00 LFT	0	0	0	72,900	0	72,900	135.00
TOTAL "E" ZONE WELLS	2.00 EA	0	0	0	72,900	0	72,900	36450.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10. 5.30. EXTRACTION PUMPS								
USR AA Extraction Pumps Incl Controllers	41.00 EA	0.00 0	0.00 0	2500.00 102,500	0.00 0	0.00 0	2500.00 102,500	2500.00
USR AA Extraction Pumps Incl Controllers; Top Loading for LNA	5.00 EA	0.00 0	0.00 0	2700.00 13,500	0.00 0	0.00 0	2700.00 13,500	2700.00
USR AA 600 SCFM Compressor to run pu mps	1.00 EA	0.00 0	0.00 0	40000.00 40,000	0.00 0	0.00 0	40000.00 40,000	40000.00
USR AA Discharge Tubing Pump to Wellhead; SS	5355.00 LFT	0.00 0	0.00 0	11.00 58,905	0.00 0	0.00 0	11.00 58,905	11.00
USR AA Air Supply Tubing Wellhead to Pumps	5355.00 LFT	0.00 0	0.00 0	6.00 32,130	0.00 0	0.00 0	6.00 32,130	6.00
USR AA Pulse Counters w/ 4-20 ma Sig nal	46.00 EA	0.00 0	0.00 0	395.00 18,170	0.00 0	0.00 0	395.00 18,170	395.00
USR AA Liquid Level Measurment, Portable Magnahelic	1.00 EA	0.00 0	0.00 0	1000.00 1,000	0.00 0	0.00 0	1000.00 1,000	1000.00
USR AA Downwell Liquid Level Bubbler Tube	5000.00 LFT	0.00 0	0.00 0	2.00 10,000	0.00 0	0.00 0	2.00 10,000	2.00
USR AA Spare Parts; Initial Supply f or Pumps	1.00 LS	0.00 0	0.00 0	1000.00 1,000	0.00 0	0.00 0	1000.00 1,000	1000.00
USR AA Connection Fittings; Air & Discharg Tubing/Manifolds, Et c.	46.00 EA	0.00 0	0.00 0	200.00 9,200	0.00 0	0.00 0	200.00 9,200	200.00
USR AA 40 GPM Turbine Pump, High Hea d	2.00 EA	0.00 0	0.00 0	15000.00 30,000	0.00 0	0.00 0	15000.00 30,000	15000.00
TOTAL EXTRACTION PUMPS	49.00 EA	0	0	316,405	0	0	316,405	6457.24
3300.20.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps	49.00 EA	0.00 0	0.00 0	0.00 0	725.00 35,525	0.00 0	725.00 35,525	725.00
USR AA Install Down-hole Instruments	98.00 EA	0.00 0	0.00 0	0.00 0	450.00 44,100	0.00 0	450.00 44,100	450.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL INSTALL PUMPS, INSTRUMENTS	49.00 EA	0	0	0	79,625	0	79,625	1625.00
3300.20.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	44.00 EA	0	0	0	11,000	0	11,000	250.00
TOTAL WELL TOP COMPLETION	44.00 EA	0	0	0	11,000	0	11,000	250.00
3300.20.10. 5.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	44.00 EA	0	0	0	44,000	0	44,000	1000.00
TOTAL WELL DEVELOPMENT	44.00 EA	0	0	0	44,000	0	44,000	1000.00
TOTAL EXTRACTION WELLS	1.00 JOB	0	0	316,405	873,750	0	1,190,155	1190155.00
3300.20.10.20. MONITORING WELLS								
3300.20.10.20. 5. INSTALL WELLS								
3300.20.10.20. 5. 5. ZONE A								
USR AA Install 4" Monitoring Well		0.00	0.00	0.00	100.00	0.00	100.00	
	900.00 LFT	0	0	0	90,000	0	90,000	100.00
TOTAL ZONE A	15.00 JOB	0	0	0	90,000	0	90,000	6000.00
3300.20.10.20. 5.10. ZONE B								
USR AA Install 4" Monitoring Well		0.00	0.00	0.00	100.00	0.00	100.00	
	1710.00 LFT	0	0	0	171,000	0	171,000	100.00
TOTAL ZONE B	18.00 JOB	0	0	0	171,000	0	171,000	9500.00
3300.20.10.20. 5.15. ZONE C								
USR AA Install 4" Monitoring Well		0.00	0.00	0.00	100.00	0.00	100.00	
	2170.00 LFT	0	0	0	217,000	0	217,000	100.00
TOTAL ZONE C	14.00 JOB	0	0	0	217,000	0	217,000	15500.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.20. 5.20. ZONE D								
USR AA Install 4" Monitoring Well		0.00	0.00	0.00	100.00	0.00	100.00	
	1900.00 LFT	0	0	0	190,000	0	190,000	100.00
TOTAL ZONE D	10.00 JOB	0	0	0	190,000	0	190,000	19000.00
3300.20.10.20. 5.25. ZONE E								
USR AA Install 4" Monitoring Well		0.00	0.00	0.00	100.00	0.00	100.00	
	1925.00 LFT	0	0	0	192,500	0	192,500	100.00
TOTAL ZONE E	7.00 JOB	0	0	0	192,500	0	192,500	27500.00
3300.20.10.20. 5.30. OTHER WELL INSTALLATION COSTS								
AIR AA Tank Decontamination, High		0.58	0.13	0.00	0.00	0.00	0.71	
Pressure Wash	5120.00 SF	2,972	656	0	0	0	3,629	0.71
USR AA Engineer/Scientist IV; Geolog		59.40	0.00	0.00	0.00	0.00	59.40	
ist	200.00 HR	11,880	0	0	0	0	11,880	59.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	1000.00 MI	0	0	0	0	310	310	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	20.00 DAY	0	0	0	0	760	760	38.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Lodging		0.00	0.00	0.00	0.00	80.00	80.00	
	20.00 DAY	0	0	0	0	1,600	1,600	80.00
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	180.00 EA	0	0	0	72,000	0	72,000	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	40.00 MO	0	40,000	0	0	0	40,000	1000.00
TOTAL OTHER WELL INSTALLATION COSTS	1.00 JOB	14,852	40,656	0	72,000	2,718	130,227	130226.54
TOTAL INSTALL WELLS	1.00 EA	14,852	40,656	0	932,500	2,718	990,727	990726.54

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT								
USR AA Lo-Flo Monitoring Well Sampli		0.00	0.00	2000.00	0.00	0.00	2000.00	
ng	25.00 EA	0	0	50,000	0	0	50,000	2000.00
Pump w/Teflon Tubing								
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00 JOB	0	0	50,000	0	0	50,000	50000.00
3300.20.10.20.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	600.00	0.00	600.00	
	64.00 EA	0	0	0	38,400	0	38,400	600.00
TOTAL WELL DEVELOPMENT	1.00 JOB	0	0	0	38,400	0	38,400	38400.00
TOTAL MONITORING WELLS	1.00 JOB	14,852	40,656	50,000	970,900	2,718	1,079,127	1079126.54
3300.20.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	110.00 EA	0	0	0	9,570	0	9,570	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83	110.00 EA	0	0	0	17,710	0	17,710	161.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	180.00	0.00	180.00	
70)	110.00 EA	0	0	0	19,800	0	19,800	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	47,080	0	47,080	47080.00
3300.20.10.35. ANALYTICALS LIQUIDS								
Initital baseline samples from monitoring wells and new wells.								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	48.00 EA	0	0	0	6,720	0	6,720	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	48.00 EA	0	0	0	7,440	0	7,440	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	48.00 EA	0	0	0	1,920	0	1,920	40.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M HTW AA Total Organic Carbons (90600			0.00	0.00	0.00	55.00	0.00	55.00	
	48.00	EA	0	0	0	2,640	0	2,640	55.00
M AIR AA Dioxins & Dibenzofurans (8290)			0.00	0.00	0.00	950.00	0.00	950.00	
	11.00	EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00	JOB	0	0	0	29,170	0	29,170	29170.00

3300.20.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geolog ist			59.40	0.00	0.00	0.00	0.00	59.40	
	320.00	HR	19,008	0	0	0	0	19,008	59.40
USR AA Engineer/Scientist IV, Sampli ng Lead			59.40	0.00	0.00	0.00	0.00	59.40	
	320.00	HR	19,008	0	0	0	0	19,008	59.40
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	20.00	HR	1,342	0	0	0	0	1,342	67.10
USR AA Technician/Analyst IV, Sampli ng Tech			33.00	0.00	0.00	0.00	0.00	33.00	
	320.00	HR	10,560	0	0	0	0	10,560	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	16.00	HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car office.			0.00	0.00	0.00	0.00	0.31	0.31	
	600.00	MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging Mgr and HSO.			0.00	0.00	0.00	0.00	198.00	198.00	
	10.00	DAY	0	0	0	0	1,980	1,980	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	10.00	DAY	0	0	0	0	420	420	42.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	10.00 EA	0	0	0	0	500	500	50.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00
USR AA Hose		0.00	0.00	2.50	0.00	0.00	2.50	
	400.00 LFT	0	0	1,000	0	0	1,000	2.50
USR AA Misc Sampling Equipment/Materials	1.00 LS	0.00	0.00	400.00	0.00	0.00	400.00	
		0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00 JOB	51,775	0	1,400	50	3,134	56,359	56358.80

3300.20.10.45. DISPOSALS

3300.20.10.45. 5. WASTE CHARACTERIZATION

M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE CHARACTERIZATION	1.00 JOB	0	0	424	5,735	0	6,159	6159.08
3300.20.10.45.10. DISPOSE DRILL CUTTINGS								
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	20.00 EA	0	0	0	8,000	0	8,000	400.00
USR AA Transport Cuttings to Disposa l Site		0.00	0.00	0.00	40.00	0.00	40.00	
	240.00 CY	0	0	0	9,600	0	9,600	40.00
USR AA Disposal of Cuttings		0.00	0.00	0.00	60.00	0.00	60.00	
	360.00 TON	0	0	0	21,600	0	21,600	60.00
TOTAL DISPOSE DRILL CUTTINGS	1.00 JOB	0	0	0	39,200	0	39,200	39200.00
3300.20.10.45.15. DISPOSE LIQUIDS								
USR AA Frac Tank Rental		0.00	600.00	0.00	0.00	0.00	600.00	
	16.00 MO	0	9,600	0	0	0	9,600	600.00
USR AA T&D Liquids to Disposal Facil ity		0.00	0.00	0.00	0.50	0.00	0.50	
	200000 GAL	0	0	0	100,000	0	100,000	0.50
TOTAL DISPOSE LIQUIDS	1.00 JOB	0	9,600	0	100,000	0	109,600	109600.00
TOTAL DISPOSALS	1.00 JOB	0	9,600	424	144,935	0	154,959	154959.08
TOTAL INSTALL WELLS	1.00 JOB	66,627	50,256	368,229	2,065,885	5,852	2,556,849	2556849.42
3300.20.15. PIPING								
3300.20.15.10. LIQUID RECOVERY SYSTEM								
M MIL PL 4"(10cm) Galv Pipe,PE Sch40 A 53		10.21	0.24	6.00	0.00	0.00	16.45	
	2000.00 LF	26,227	613	15,408	0	0	42,248	21.12
MIL PL 1-1/2" (40mm) Galv Steel Pipe ASTM A-53, T&C, Sch 40		3.99	0.04	2.20	0.00	0.00	6.23	
	1700.00 LF	8,706	80	4,804	0	0	13,590	7.99
MIL PL 1-1/2"90 Degree Ell,150# MI G alv		19.52	0.18	4.99	0.00	0.00	24.69	
	10.00 EA	251	2	64	0	0	317	31.70

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	30.00	0.00	0.00	200.22	
Wt	10.00 EA	2,136	50	385	0	0	2,571	257.08
M MIL PL 4"Tee,Full Size Butt Weld Std		249.95	5.85	55.00	0.00	0.00	310.80	
Wt	2.00 EA	642	15	141	0	0	798	399.06
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	86.00 EA	3,496	82	298	0	0	3,876	45.07
AIR PL Slip On Flange 4"		105.54	2.47	25.70	0.00	0.00	133.70	
	20.00 EA	2,710	63	660	0	0	3,433	171.67
MIL PL 1-1/2"Sord Flange,Galv (125#		35.01	0.32	9.24	0.00	0.00	44.57	
CI)	172.00 EA	7,733	71	2,040	0	0	9,844	57.23
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	5.00 EA	535	13	74	0	0	621	124.24
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	172.00 EA	22,080	210	1,664	0	0	23,954	139.27
MIL PL 1-1/2" Bronze 125# Gate Valve		39.07	0.33	28.92	0.00	0.00	68.31	
Threaded,Brazed or Soldered	43.00 EA	2,157	18	1,597	0	0	3,772	87.71
MIL PL 4"Iron Body,Brz Mtd,Flg,Gate		195.19	1.79	299.39	0.00	0.00	496.37	
Vlv	4.00 EA	1,002	9	1,538	0	0	2,549	637.32
125 #								
USR PL Pipe Supports		59.36	1.39	20.00	0.00	0.00	80.75	
	370.00 EA	28,202	660	9,501	0	0	38,363	103.68
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	105,876	1,886	38,174	0	0	145,937	145936.50
3300.20.15.35. AIR PIPING								
MIL PL 2"(50mm) A-53 Pipe, Sch 40		4.83	0.04	2.13	0.00	0.00	7.00	
Not Incl Hangers or Fittings	3000.00 LF	18,598	171	8,205	0	0	26,973	8.99
MIL PL 1"(25mm) A-53 Pipe, Sch 40		3.21	0.03	1.02	0.00	0.00	4.25	
Not Incl Hangers or Fittings	1000.00 LF	4,118	38	1,304	0	0	5,460	5.46
MIL PL 2" 90 Degree ELL,150# MI Blac		24.79	0.23	6.25	0.00	0.00	31.27	
k	20.00 EA	637	6	160	0	0	803	40.15

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1" 90 Degree Ell, 150# MI Bla		15.29	0.14	1.96	0.00	0.00	17.39	
ck	90.00 EA	1,767	16	227	0	0	2,010	22.33
MIL PL 1" Coupling, Strt 150# MI Bla		15.29	0.14	2.29	0.00	0.00	17.72	
ck	20.00 EA	393	4	59	0	0	455	22.75
MIL PL 2" Coupling, Strt 150# MI Bla		24.79	0.23	5.68	0.00	0.00	30.70	
ck	10.00 EA	318	3	73	0	0	394	39.42
MIL PL 1" Union, 150# MI Black		20.85	0.19	5.68	0.00	0.00	26.72	
	100.00 EA	2,677	25	729	0	0	3,431	34.31
MIL PL 2" Union, 150# MI Black		36.70	0.34	12.09	0.00	0.00	49.12	
	20.00 EA	942	9	311	0	0	1,261	63.07
MIL PL 1" Nipple, Black Stl Sch 40,		7.06	0.06	0.59	0.00	0.00	7.72	
4"	100.00 EA	906	8	76	0	0	991	9.91
MIL PL 2" Nipple, Black Stl Sch 40,		9.86	0.09	1.19	0.00	0.00	11.14	
4"	20.00 EA	253	2	31	0	0	286	14.31
MIL PL 2" Tee, Red Out 150# MI Galv		36.70	0.34	13.41	0.00	0.00	50.45	
	100.00 EA	4,712	43	1,722	0	0	6,477	64.77
MIL PL 1" Tee, Straight 150# MI Galv		20.85	0.19	3.66	0.00	0.00	24.70	
	100.00 EA	2,677	25	470	0	0	3,172	31.72
MIL PL 1"D Plug Valve, Semi-Stl,Scrd		28.22	0.24	29.42	0.00	0.00	57.88	
Lubricated,Wrench Oper w/Wren	100.00 EA	3,623	30	3,778	0	0	7,431	74.31
ch								
MIL PL 2"D Plug Valve, Semi-Stl,Scrd		50.79	0.43	31.31	0.00	0.00	82.53	
Lubricated,Wrench Oper w/Wren	5.00 EA	326	3	201	0	0	530	105.97
ch								
M MIL PL 1"Thrd St Press Regul & Red,I		59.06	0.53	356.42	0.00	0.00	416.00	
B	88.00 EA	6,673	59	40,272	0	0	47,004	534.14
Sgl Seat,Sprg Load Dir Act Diap								
MIL PL 1" ID Hose x 1-1/4" MPT		13.74	0.07	0.82	0.00	0.00	14.63	
Serrated Shank Nipple	88.00 EA	1,552	8	93	0	0	1,653	18.79
TOTAL AIR PIPING	1.00 JOB	50,172	449	57,710	0	0	108,332	108331.97

3300.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.20.15.40. DISCHARGE PIPING									
MIL PL 4" (10cm) Galv Steel Pipe			23.72	0.24	6.72	0.00	0.00	30.67	
ASTM A-53, T&C, Sch 40	1000.00	LF	30,450	307	8,624	0	0	39,382	39.38
MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	60.52	0.00	0.00	113.42	
v	2.00	EA	134	1	155	0	0	291	145.62
MIL PL 4" Screwed Flange,Galv (125#			71.83	0.72	17.49	0.00	0.00	90.04	
CI)	4.00	EA	369	4	90	0	0	462	115.62
MIL PL 4"Iron Body,Brz Mtd,Flg,Gate			195.19	1.79	299.39	0.00	0.00	496.37	
Vlv	4.00	EA	1,002	9	1,538	0	0	2,549	637.32
125 #									
MIL PL Trench 1/2 CY Hyd Exc, Hvy So			1.88	0.83	0.00	0.00	0.00	2.71	
il	300.00	CY	724	320	0	0	0	1,044	3.48
51 CY/Hr (40M3)/Hr									
MIL PL Backfill Trench w/Sm FEnd Loa			1.09	0.46	0.00	0.00	0.00	1.55	
der	390.00	CY	545	229	0	0	0	774	1.99
Without Compaction									
MIL PL Compaction, 6" Layers, Vib Pl			2.86	0.07	0.00	0.00	0.00	2.92	
ate	390.00	CY	1,430	33	0	0	0	1,463	3.75
(15cm) Layers									
TOTAL DISCHARGE PIPING	1.00	JOB	34,656	904	10,407	0	0	45,967	45966.86
TOTAL PIPING	1.00	JOB	190,705	3,240	106,291	0	0	300,235	300235.33
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	580,868	67,300	1,833,643	2,657,585	10,072	5,149,468	5149467.90

John Spear
06/12/01 07:01 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc:
Subject: Bioreactor pricing for P&T option

Harry,
Got this today from US Filter. Working on the equipment for the thermal option.
Jack

—— Forwarded by John Spear/Cranford/URSCorp on 06/12/2001 10:05 AM ——

Hall Robert
<HallR@USFilter.com
>
06/11/2001 08:31 AM

To: "Jack Spear (E-mail)" <john_spear@urscorp.com>
cc:
Subject: FW: URS Project

Jack,

Attached is an e-mail message that contains the price information you requested. You should estimate an additional $100K to $150K for O/W separation and liquid phase carbon treatment. Also included is a spread sheet that contains some operating cost information.

Sincerely,

Robert J. Hall
USFilter Eastern Region Capital Sales
2643 Hamilton Blvd.
Allentown, PA 18104
phone - 610-740-0215
fax - 610-740-0248
cell- 742-312-7860

<<URS 6-8-01.xls>>

Confidentiality Note: This e-mail message and any attachments to it are intended only for the named recipients and may contain legally privileged and / or confidential information. If you are not one of the intended recipients please do not duplicate or forward this e-mail message and immediately delete it from your computer.

> -----Original Message-----
> From: Greene, Paul
> Sent: Friday, June 08, 2001 9:50 AM
> To: Hall Robert
> Subject: FW: URS Project
> Importance: High
>
>
>
>
> -----Original Message-----
> From: Whittier, Casey
> Sent: Friday, June 08, 2001 9:38 AM
> To: Greene, Paul
> Cc: Lalor, Dan
> Subject: RE: URS Project
> Importance: High
>
> Paul,
>
> Attached is the preliminary design and budgetary price for a GAC Fluidized
> Bed Reactor (FBR) system for the treatment of groundwater at a wood
> preserving site. I designed the FBR system for removal of 40 mg/l COD at
> 400 gpm. This assumes the 40 mg/l of COD is readily biodegradable. It
> would be helpful to obtain additional data on the treatment requirements
> and the individual contaminants present in the water. If this is
> available please forward to me.
>
> A pilot test may be necessary to determine the actual COD removal
> achievable in the FBR. Our pilot FBR treats up to 30 gpm, and represents
> our smallest full scale unit available. Consequently, the pilot test
> results are directly scaleable to the full scale system. In addition, the

> pilot unit demonstrates the operation simplicity of an FBR system. The
> lease rate for our pilot GAC-FBR is $10,000 the first month and $6,700
> each month thereafter. This includes one week of startup services from
> one of our field process engineers.
>
> The full scale-design for this system consists of a one 10 foot diameter
> FBR. The reactor is an API 650 carbon steel tank. Typically, for a
> system this size the ancillary equipment is shipped loose for installation
> in the field. The budget price for this system is $645,000. The scope of
> supply includes engineering, all equipment, controls/instrumentation,
> media, start-up, and training. Installation of equipment, concrete pads,
> interconnecting pipe, and the MCC are not included in the budgetary
> equipment price. Operating costs for the system are detailed in the
> attached design outline.
>
> Feel free to contact me if you have any additional questions.
>
> Best regards,
>
> Casey Whittier
> Product Manager-FBR Systems
> USFilter, Envirex Products
> 1901 S. Prairie Avenue
> Waukesha, WI 53189-7374
> Phone: (262) 521-8506
> Fax: (262) 547-4120
> e-mail: whittierc@usfilter.com
>
> <<URS 6-8-01.xls>>
>
> Confidentiality Note: This e-mail message and any attachments to it are
> intended only for the named recipients and may contain confidential
> information. If you are not one of the intended recipients, please do not
> duplicate or forward this e-mail message and immediately delete it from
> your computer.
>
>
> -----Original Message-----
> From: Lalor, Dan
> Sent: Thursday, June 07, 2001 3:32 PM
> To: Greene, Paul; Whittier, Casey
> Cc: Mazewski, Gene
> Subject: RE: URS Project
>
>
>
> -----Original Message-----
> From: Greene, Paul
> Sent: Thursday, June 07, 2001 3:17 PM
> To: Lalor, Dan
> Cc: Mazewski, Gene
> Subject: URS Project
>
>
>

URS 6-8-01.xls URS 6-8-01.xls

U.S. Filter/Envirex

GAC-Fluid Bed Design Outline

08-Jun-2001

Owner/Engineer:	URS
Project:	Wood Preserving Site Groundwater
Date:	6/8/01
By:	Casey Whittier

Influent Characteristics:

Flow, gpm	400	Flow, MGD	0.58
BTEX, mg/l	0.0	BTEX , lb/d	0.0
Benzene	0.0	BTEX-COD, mg/l	0.0
Toluene	0.0	BTEX-OD, mg/l	0.0
Ethyl Benzene	0.0	BTEX-OD, lb/d	0.0
Xylenes, Total	0.0		
Other Aromatics	0.0	NH3-N, lb/d	0.0
Ammonia-N, mg/l	0.0	NH3-OD, lb/d	0.0
TPH's, mg/l	0.0	TPH COD, lb/d	0.0
Chlorinated, mg/l	0.0	Chlorinated Org OD, lb/d	0.0
Other COD, mg/l	40.0	Total COD, mg/l	40.0
Iron, mg/l	0.0	Total COD, lb/d	192.0
Temperature, F	55.0	Total O2 Demand, lb/d	163.2
TSS, mg/l	0.0	TSS, lb/d	0

Fluid Bed Recommendation:

Reactor Diameter:	10	Annual Operating Cost:	$16,571
Quantity:	1	Budget Cost:	$645,000

Fluid Bed Design Parameters:

Actual Design			
Reactor Diameter, ft	10.00	Bed Volume, cf	1100
Number of Reactors	1.0	R+Q Flow, gpm	1021
Bed Depth, ft	14.0	R/Q Ratio	1.6
Flux, gpm/sf	13.0	HRT, minutes	21
Total COD Load, lb/d/kcf	174.6		
NH3-OD Load, lb/d/kcf	0.0		
BTEX-COD Load, lb/d/kcf	0.0	Carbon, lb ea	16493
NH3 Load, lb/d/kcf	0.0		
Total O2 Load, lb/d/kcf	148.4	Carbon Total	16493

Steady State Operating Characteristics:

O2 Used, lb/d	172.8	PSA Size, scfh	102
Effluent O2, mg/l	2.0		
Reactor Influent O2 (mg/l)	15.3		
TSS Out if to efflent, mg/l	6.8	TSS Generated, mg/l	6.8
Solids out if to effleunt, lbs/d	32.6	Solids Generated, lb/d	32.6

|::

U.S. Filter/Envirex

GAC-Fluid Bed Cost Estimate

Estimated Operating Costs:

Electric Cost, $KWhr	$0.06	Pump Efficiency, %	78
		Motor Efficiency, %	94
Fluid Pump bhp ea:	15.0	Pump, $/d	$16.07
PBC Pump bhp ea:	6.0	PBC Pump bhp ea:	$6.47
Growth Control hp	1.5	Pump, $/d	$1.61
Nutrient Feed Pump hp	0.1	Pump, $/d	$0.13
Number of Units	1.00	Total Pump, $/d	$24.29
Diameter	10.00		
Oxygen PSA, lb/d	172.80	O2 $/d	$4.67
Standard Nutrients, gal/d	3.97	Nutrients, $/d	$14.30
Attrition, lb/d	2.26	Carbon, $/d	$2.15
		Total, $/d	$45.40
		Total Annual	$16,571.34

Budgetary Capital Cost:

Basis of Sell Price: Equipment only, does not include installation, interconnecting pipe, MCC, building, finish paint/insulation
INCLUDES: engineering, all equipment controls/instrumentation, carbon, O2 generator, PBC, start-up, training
MATL BASIS: API 650 tanks/Plasite 7122 interior, ANSI 31.3 steel pumps,ductile valves,ss trim

CAPITAL... $645,000

U.S. Filter/Envirex

GAC-Fluid Bed Design Outline

08-Jun-2001

Owner/Engineer:	URS
Project:	Wood Preserving Site Groundwater
Date:	6/8/01
By:	Casey Whittier

Influent Characteristics:

Flow, gpm	400	Flow, MGD	0.58
BTEX, mg/l	0.0	BTEX , lb/d	0.0
Benzene	0.0	BTEX-COD, mg/l	0.0
Toluene	0.0	BTEX-OD, mg/l	0.0
Ethyl Benzene	0.0	BTEX-OD, lb/d	0.0
Xylenes, Total	0.0		
Other Aromatics	0.0	NH3-N, lb/d	0.0
Ammonia-N, mg/l	0.0	NH3-OD, lb/d	0.0
TPH's, mg/l	0.0	TPH COD, lb/d	0.0
Chlorinated, mg/l	0.0	Chlorinated Org OD, lb/d	0.0
Other COD, mg/l	40.0	Total COD, mg/l	40.0
Iron, mg/l	0.0	Total COD, lb/d	192.0
Temperature, F	55.0	Total O2 Demand, lb/d	163.2
TSS, mg/l	0.0	TSS, lb/d	0

Fluid Bed Recommendation:

Reactor Diameter:	10	Annual Operating Cost:	$16,571
Quantity:	1	Budget Cost:	$645,000

Fluid Bed Design Parameters:

Actual Design			
Reactor Diameter, ft	10.00	Bed Volume, cf	1100
Number of Reactors	1.0	R+Q Flow, gpm	1021
Bed Depth, ft	14.0	R/Q Ratio	1.6
Flux, gpm/sf	13.0	HRT, minutes	21
Total COD Load, lb/d/kcf	174.6		
NH3-OD Load, lb/d/kcf	0.0		
BTEX-COD Load, lb/d/kcf	0.0	Carbon, lb ea	16493
NH3 Load, lb/d/kcf	0.0		
Total O2 Load, lb/d/kcf	148.4	Carbon Total	16493

Steady State Operating Characteristics:

O2 Used, lb/d	172.8	PSA Size, scfh	102
Effluent O2, mg/l	2.0		
Reactor Influent O2 (mg/l)	15.3		
TSS Out if to efflent, mg/l	6.8	TSS Generated, mg/l	6.8
Solids out if to effleunt, lbs/d	32.6	Solids Generated, lb/d	32.6

|::

U.S. Filter/Envirex

GAC-Fluid Bed Cost Estimate

Estimated Operating Costs:

Electric Cost, $KWhr	$0.06	Pump Efficiency, %	78
		Motor Efficiency, %	94
Fluid Pump bhp ea:	15.0	Pump, $/d	$16.07
PBC Pump bhp ea:	6.0	PBC Pump bhp ea:	$6.47
Growth Control hp	1.5	Pump, $/d	$1.61
Nutrient Feed Pump hp	0.1	Pump, $/d	$0.13
Number of Units	1.00	Total Pump, $/d	$24.29
Diameter	10.00		
Oxygen PSA, lb/d	172.80	O2 $/d	$4.67
Standard Nutrients, gal/d	3.97	Nutrients, $/d	$14.30
Attrition, lb/d	2.26	Carbon, $/d	$2.15
		Total, $/d	$45.40
		Total Annual	$16,571.34

Budgetary Capital Cost:

Basis of Sell Price: Equipment only, does not include installation, interconnecting pipe, MCC, building, finish paint/insulation
INCLUDES: engineering, all equipment controls/instrumentation, carbon, O2 generator, PBC, start-up, training
MATL BASIS: API 650 tanks/Plasite 7122 interior, ANSI 31.3 steel pumps,ductile valves,ss trim

CAPITAL... $645,000

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25. START UP, TESTING, O&M PLAN									
3300.25. 5. O&M MANUAL									
3300.25. 5.10. PCS Commissioning Manual									
USR AA Principal Engineer/Scientist I			91.30	0.00	0.00	0.00	0.00	91.30	
	80.00	HR	7,304	0	0	0	0	7,304	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	16.00	HR	616	0	0	0	0	616	38.50
USR AA ODC's			0.00	0.00	0.00	0.00	500.00	500.00	
	1.00	LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00	EA	7,920	0	0	0	500	8,420	8420.00
3300.25. 5.13. Preliminary Draft - O&M Manual Spec Section 01830									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	160.00	HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	60.00	HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist II - Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	8.00	HR	425	0	0	0	0	425	53.13
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	20.00	HR	1,826	0	0	0	0	1,826	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	20.00	HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	4.00	HR	414	0	0	0	0	414	103.40

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL Preliminary Draft - O&M Manua	1.00	EA	23,169	0	0	0	600	23,769	23768.64
3300.25. 5.18. Revised Draft - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	20.00	HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	4.00	HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	8.00	HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	8.00	HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00	EA	7,955	0	0	0	600	8,555	8555.20
3300.25. 5.23. Final - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; Project Manager	8.00 HR	91.30 730	0.00 0	0.00 0	0.00 0	0.00 0	91.30 730	91.30
USR AA Contractors Chem Quality Control Officer	2.00 HR	84.70 169	0.00 0	0.00 0	0.00 0	0.00 0	84.70 169	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	4.00 HR	84.70 339	0.00 0	0.00 0	0.00 0	0.00 0	84.70 339	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	1.00 HR	103.40 103	0.00 0	0.00 0	0.00 0	0.00 0	103.40 103	103.40
USR AA Technician IV - Plant Operator	20.00 HR	24.15 483	0.00 0	0.00 0	0.00 0	0.00 0	24.15 483	24.15
USR AA Engineer/Scientist IV	4.00 HR	59.40 238	0.00 0	0.00 0	0.00 0	0.00 0	59.40 238	59.40
TOTAL Final - O&M Manual	1.00 EA	5,055	0	0	0	600	5,655	5654.60
TOTAL O&M MANUAL	1.00 JOB	44,098	0	0	0	2,300	46,398	46398.44
3300.25.10. STARTUP/COMMISSION TREATMENT SYS								
3300.25.10. 5. ENGINEERS & TECHNICIANS								
USR AA Principal Engineer/Scientist III; Program Mgr.	40.00 HR	103.40 4,136	0.00 0	0.00 0	0.00 0	0.00 0	103.40 4,136	103.40
USR AA Engineer/Scientist IV - Startup/Proveout Project Manager	173.00 HR	59.40 10,276	0.00 0	0.00 0	0.00 0	0.00 0	59.40 10,276	59.40
USR AA Principal Engineer/Scientist I; P&ID Checkout	120.00 HR	91.30 10,956	0.00 0	0.00 0	0.00 0	0.00 0	91.30 10,956	91.30
USR AA Principal Engineer/Scientist I; I&E Checkout	40.00 HR	91.30 3,652	0.00 0	0.00 0	0.00 0	0.00 0	91.30 3,652	91.30
USR AA Principal Engineer/Scientist I; PC/MMI Checkout	60.00 HR	91.30 5,478	0.00 0	0.00 0	0.00 0	0.00 0	91.30 5,478	91.30

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist I; PC/MMI Programmer	100.00 HR	91.30 9,130	0.00 0	0.00 0	0.00 0	0.00 0	91.30 9,130	91.30
USR AA Principal Engineer/Scientist I; Startup Engineer	40.00 HR	91.30 3,652	0.00 0	0.00 0	0.00 0	0.00 0	91.30 3,652	91.30
USR AA Senior Engineer/Scientist IV - Director QA/QC	8.00 HR	84.70 678	0.00 0	0.00 0	0.00 0	0.00 0	84.70 678	84.70
USR AA Senior Engineer/Scientist II Purchaser	40.00 HR	72.60 2,904	0.00 0	0.00 0	0.00 0	0.00 0	72.60 2,904	72.60
USR AA Technician/Analyst IV - Secretary	40.00 HR	33.00 1,320	0.00 0	0.00 0	0.00 0	0.00 0	33.00 1,320	33.00
USR AA Senior Engineer/Scientist IV; Project Chemist	80.00 HR	84.70 6,776	0.00 0	0.00 0	0.00 0	0.00 0	84.70 6,776	84.70
USR AA Senior Engineer/Scientist II; GWTP Plant Manager	240.00 HR	53.13 12,751	0.00 0	0.00 0	0.00 0	0.00 0	53.13 12,751	53.13
USR AA Engineer/Scientist IV - Plant Operator	173.00 HR	43.47 7,520	0.00 0	0.00 0	0.00 0	0.00 0	43.47 7,520	43.47
MIL AA Electricians	80.00 HR	35.93 2,874	0.00 0	0.00 0	0.00 0	0.00 0	35.93 2,874	35.93
USR AA Vendor/Manufacturers Reps; Installation and Startup	2.00 EA	0.00 0	0.00 0	0.00 0	4000.00 8,000	0.00 0	4000.00 8,000	4000.00
USR AA Engineer/Scientist IV - Site QC/HSO	270.00 HR	43.47 11,737	0.00 0	0.00 0	0.00 0	0.00 0	43.47 11,737	43.47
TOTAL ENGINEERS & TECHNICIANS	1.00 JOB	93,840	0	0	8,000	0	101,840	101840.47
3300.25.10.10. TRAVEL & PER DIEM								
USR AA Mileage on Personal Car, Trips for O&M Proj Mgr and HSO from office.	8000.00 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 2,480	0.31 2,480	0.31
USR AA Lodging, Vendor reps, Instrument and Electrical Engrs, O&M Proj Mgr and HSO.	60.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	80.00 4,800	80.00 4,800	80.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	60.00 DAY	0	0	0	0	2,280	2,280	38.00
USR AA Airfare Trips for Vendor Reps and Instrumentation and Electrical Engineering personnel.		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car, Total of 2 cars f or two months.		0.00	0.00	0.00	0.00	45.00	45.00	
	80.00 DAY	0	0	0	0	3,600	3,600	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	5.00	5.00	
	60.00 EA	0	0	0	0	300	300	5.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	4.00 EA	0	0	0	0	40	40	10.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	15,500	15,500	15500.00
3300.25.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot hes		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	1.00 MO	0	1,300	0	0	200	1,500	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P KUP		0.00	7.52	0.00	0.00	0.00	7.52	
	320.00 HR	0	2,407	0	0	0	2,407	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	3,707	1,000	0	200	4,907	4907.01
3300.25.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine		0.00	0.00	0.00	0.00	35.00	35.00	
	2.00 MO	0	0	0	0	70	70	35.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	4.00 MO	0	0	0	0	300	300	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	2.00 MO	0	0	0	0	170	170	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Septic System Maintenance		0.00	0.00	0.00	1200.00	0.00	1200.00	
	2.00 MO	0	0	0	2,400	0	2,400	1200.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	4.00 MO	0	1,600	0	0	0	1,600	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	2,400	2,800	2,400	14,440	22,040	22040.00

3300.25.10.26. OPERATING/PROCESS UTILITIES
Assume 160/kw/hour per hour @ $0.06/KW. Total startup operating time is assumed at 100 hours.

USR AA Electrical Power		0.00	0.00	0.00	9.60	0.00	9.60	
	100.00 HR	0	0	0	960	0	960	9.60
TOTAL OPERATING/PROCESS UTILITIES	1.00 JOB	0	0	0	960	0	960	960.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.30. CHEMICALS								
USR AA GAC (Liquid) ; average useage		0.00	0.00	2.00	0.00	0.00	2.00	
35	1400.00 LB	0	0	2,800	0	0	2,800	2.00
lb/day x 40 days operation								
TOTAL CHEMICALS	1.00 JOB	0	0	2,800	0	0	2,800	2800.00
3300.25.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filters/ Cartridges		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	1,000	0	0	1,000	1000.00
3300.25.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	1170.00	0.00	0.00	0.00	1170.00	
	2.00 MO	0	2,340	0	0	0	2,340	1170.00
USR AA LEL		0.00	320.00	0.00	0.00	0.00	320.00	
	2.00 MO	0	640	0	0	0	640	320.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	2,980	0	0	0	2,980	2980.00
3300.25.10.45. DISPOSALS STARTUP								
AA Sludge Disposal		0.00	0.00	0.00	350.00	0.00	350.00	
	10.00 DRM	0	0	0	3,500	0	3,500	350.00
AA Sludge Waste Characterization		0.00	0.00	0.00	0.00	665.00	665.00	
-	2.00 EA	0	0	0	0	1,330	1,330	665.00
Full TCLP & Waste Char.								
TOTAL DISPOSALS STARTUP	1.00 JOB	0	0	0	3,500	1,330	4,830	4830.00
3300.25.10.50. PERSONNEL TRAINING								
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00 HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Senior Engineer/Scientist II;		53.13	0.00	0.00	0.00	0.00	53.13	
GWTP Plant Manager	80.00 HR	4,250	0	0	0	0	4,250	53.13

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -		33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00 HR	528	0	0	0	0	528	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	2000.00 MI	0	0	0	0	620	620	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	80.00	80.00	
	2.00 DAY	0	0	0	0	160	160	80.00
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	10.00 DAY	0	0	0	0	380	380	38.00
USR AA Misc Materials		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00 JOB	13,539	0	500	0	1,160	15,199	15198.80

3300.25.10.55. SAMPLING/ANALYSIS; STARTUP

3300.25.10.55.05. DATA VALIDATION

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL DATA VALIDATION	1.00 JOB	5,940	0	0	0	0	5,940	5940.00

3300.25.10.55.25. SAMPLING TECHNICIANS

3300.25.10.55.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	120.00 HR	7,128	0	0	0	0	7,128	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	120.00 HR	3,960	0	0	0	0	3,960	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	15.00 DAY	0	0	0	0	2,970	2,970	198.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	15.00 DAY	0	0	0	0	630	630	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	1.00 JOB	11,088	0	1,000	0	3,786	15,874	15874.00
3300.25.10.55.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	1.00 JOB	19,325	0	0	200	2,000	21,525	21524.80
TOTAL SAMPLING TECHNICIANS	12.00 MO	30,413	0	1,000	200	5,786	37,399	3116.57

3300.25.10.55.30. PERFORMANCE MONITORING

Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
AIR AA Plastic Sheeting (Per Roll)		0.00	0.00	16.00	0.00	0.00	16.00	
	4.00 EA	0	0	64	0	0	64	16.00
AIR AA Deionized Water		0.00	0.00	10.00	0.00	0.00	10.00	
	10.00 GAL	0	0	100	0	0	100	10.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Alconox Soap			0.00	0.00	11.00	0.00	0.00	11.00	
	4.00	EA	0	0	44	0	0	44	11.00
HTW AA Overnight shipment samples/8 per chest			0.00	0.00	99.00	0.00	0.00	99.00	
	26.00	EA	0	0	2,574	0	0	2,574	99.00
HTW AA 48 Quart Ice Chest			0.00	0.00	20.65	0.00	0.00	20.65	
	26.00	EA	0	0	537	0	0	537	20.65
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	26.00	EA	0	0	131	0	0	131	5.02
M HTW AA Chemical Oxygen Demand (COD)			0.00	0.00	0.00	33.00	0.00	33.00	
	14.00	EA	0	0	0	462	0	462	33.00
M HTW AA Biochemical Oxygen Demand			0.00	0.00	0.00	38.00	0.00	38.00	
	14.00	EA	0	0	0	532	0	532	38.00
M HTW AA TAL Metals (As, Cu, Cr, Zn)			0.00	0.00	0.00	40.00	0.00	40.00	
	14.00	EA	0	0	0	560	0	560	40.00
M HTW AA TOC			0.00	0.00	0.00	55.00	0.00	55.00	
	14.00	EA	0	0	0	770	0	770	55.00
M HTW AA TPH EPA 418.1 test for total petroleum hydrocarbons by gas chromatography using procedure 8015 Mod. as detailed in EPA SW-846)			0.00	0.00	0.00	60.00	0.00	60.00	
	14.00	EA	0	0	0	840	0	840	60.00
M HTW AA Suspended Solids			0.00	0.00	0.00	17.00	0.00	17.00	
	14.00	EA	0	0	0	238	0	238	17.00
M HTW AA Dissolved Solids			0.00	0.00	0.00	17.00	0.00	17.00	
	14.00	EA	0	0	0	238	0	238	17.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	280.00	0.00	0.00	280.00	
	14.00	EA	0	0	3,920	0	0	3,920	280.00
USR AA PCP			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
M AIR AA Dioxins & Dibenzofurans (8280)			0.00	0.00	950.00	0.00	0.00	950.00	
	3.00	EA	0	0	2,850	0	0	2,850	950.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PERFORMANCE MONITORING	1.00 JOB	0	0	10,259	5,810	0	16,069	16069.42

3300.25.10.55.35. COMPLIANCE MONITORING
25 wells, Baseline smampling during startup period. Quarterly sampling during 1 yr. O&M period.

3300.25.10.55.35.10. FUGITIVE EMISSIONS
Standard TAT

USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	3.00 EA	0	15,000	0	0	0	15,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 MO	0	0	200	0	0	200	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	4.00 EA	0	0	0	880	0	880	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	4.00 EA	0	0	0	800	0	800	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	4.00 EA	0	0	0	140	0	140	35.00
HTW AA Overnight shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	2.00 EA	0	0	198	0	0	198	99.00
HTW AA 48 Quart Ice Chest		0.00	0.00	20.65	0.00	0.00	20.65	
	2.00 EA	0	0	41	0	0	41	20.65
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	2.00 EA	0	0	10	0	0	10	5.02
TOTAL FUGITIVE EMISSIONS	1.00 JOB	0	15,000	4,349	1,820	0	21,169	21169.34

3300.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.25.10.55.35.15. PERIMETER MONITORING WELLS								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
AIR AA Plastic Sheeting (Per Roll)		0.00	0.00	16.00	0.00	0.00	16.00	
	4.00 EA	0	0	64	0	0	64	16.00
AIR AA Deionized Water		0.00	0.00	10.00	0.00	0.00	10.00	
	2.00 GAL	0	0	20	0	0	20	10.00
AIR AA Alconox Soap		0.00	0.00	11.00	0.00	0.00	11.00	
	4.00 EA	0	0	44	0	0	44	11.00
HTW AA Overnight shipment samples/8 per chest		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA 48 Quart Ice Chest		0.00	0.00	20.65	0.00	0.00	20.65	
	4.00 EA	0	0	83	0	0	83	20.65
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
M HTW AA TAL Metals (As, Cu, Cr, Zn)		0.00	0.00	0.00	40.00	0.00	40.00	
	28.00 EA	0	0	0	1,120	0	1,120	40.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	280.00	0.00	0.00	280.00	
	28.00 EA	0	0	7,840	0	0	7,840	280.00
USR AA PCP		0.00	0.00	0.00	155.00	0.00	155.00	
	28.00 EA	0	0	0	4,340	0	4,340	155.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	2.00 EA	0	0	1,900	0	0	1,900	950.00
TOTAL PERIMETER MONITORING WELLS	1.00 JOB	0	0	10,375	5,460	0	15,835	15834.68
3300.25.10.55.35.20. GWTP DISCHARGE								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
AIR AA Plastic Sheeting (Per Roll)		0.00	0.00	16.00	0.00	0.00	16.00	
	4.00 EA	0	0	64	0	0	64	16.00
AIR AA Deionized Water		0.00	0.00	10.00	0.00	0.00	10.00	
	2.00 GAL	0	0	20	0	0	20	10.00

3300.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Alconox Soap			0.00	0.00	11.00	0.00	0.00	11.00	
	4.00	EA	0	0	44	0	0	44	11.00
HTW AA Overnight shipment samples/8 per chest			0.00	0.00	99.00	0.00	0.00	99.00	
	4.00	EA	0	0	396	0	0	396	99.00
HTW AA 48 Quart Ice Chest			0.00	0.00	20.65	0.00	0.00	20.65	
	4.00	EA	0	0	83	0	0	83	20.65
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	4.00	EA	0	0	20	0	0	20	5.02
M HTW AA TAL Metals (As, Cu, Cr, Zn)			0.00	0.00	0.00	80.00	0.00	80.00	
	3.00	EA	0	0	0	240	0	240	80.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	400.00	0.00	0.00	400.00	
	3.00	EA	0	0	1,200	0	0	1,200	400.00
USR AA PCP			0.00	0.00	0.00	300.00	0.00	300.00	
	3.00	EA	0	0	0	900	0	900	300.00
M AIR AA Dioxins & Dibenzofurans (8280)			0.00	0.00	950.00	0.00	0.00	950.00	
	2.00	EA	0	0	1,900	0	0	1,900	950.00
USR AA TPH			0.00	0.00	0.00	120.00	0.00	120.00	
	3.00	EA	0	0	0	360	0	360	120.00
TOTAL GWTP DISCHARGE	1.00	JOB	0	0	3,735	1,500	0	5,235	5234.68
TOTAL COMPLIANCE MONITORING	1.00	JOB	0	15,000	18,459	8,780	0	42,239	42238.70
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00	JOB	36,353	15,000	29,718	14,790	5,786	101,647	101646.92
TOTAL STARTUP/COMMISSION TREATMENT	1.00	JOB	143,732	24,087	37,818	29,650	38,416	273,703	273703.20
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	187,831	24,087	37,818	29,650	40,716	320,102	320101.64

3300.30. DEMOBILIZATION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3300.30. DEMOBILIZATION								
3300.30.21. DEMOBILIZATION								
3300.30.21.01. Removal of Temp Facilities								
USR AA Demobe Contractor Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 LS	0	0	0	200	0	200	200.00
USR AA Demobe Lunch/Shower Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer		0.00	0.00	0.00	100.00	0.00	100.00	
	1.00 LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit y Post Abatement Clean Up		187.66	19.73	25.00	0.00	0.00	232.39	
	1.00 EA	188	20	25	0	0	232	232.39
USR AA Removel Water Supply		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 EA	0	0	0	200	0	200	200.00
USR AA Remove Furniture in Temp Off ice		0.00	0.00	0.00	250.00	0.00	250.00	
	1.00 LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Remova l; 01770		284.24	87.95	0.00	0.00	0.00	372.20	
	4.00 AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00 JOB	1,325	372	25	1,350	0	3,071	3071.18
3300.30.21.02. Removal of Temp Utilities								
USR AA Remove Temp Electricity		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL Removal of Temp Utilities	1.00 JOB	0	0	0	2,000	0	2,000	2000.00
3300.30.21.04. Demobe of Construction Equipment								
USR AA Demobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00 JOB	0	0	0	0	1,000	1,000	1000.00

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL DEMOBILIZATION	1.00	JOB	1,325	372	25	3,350	1,000	6,071	6071.18
3300.30.22. REPORTS, CLOSEOUT									
3300.30.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			103.40	0.00	0.00	0.00	0.00	103.40	
	8.00	HR	827	0	0	0	0	827	103.40
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	5,183	0	0	0	600	5,783	5783.20
3300.30.22.10. Record Drawings									
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist I - Draftsman			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist II; Site Superintendant			72.60	0.00	0.00	0.00	0.00	72.60	
	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
TOTAL Record Drawings	1.00	JOB	9,953	0	0	0	600	10,553	10552.80
3300.30.22.15. Chemical Data Final Report									
USR AA Senior Engineer/Scientist IV - Chem Qual Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	16.00	HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist I; Project Manager			103.40	0.00	0.00	0.00	0.00	103.40	
	8.00	HR	827	0	0	0	0	827	103.40

3300.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00	HR	6,776	0	0	0	0	6,776	84.70
TOTAL Chemical Data Final Report	1.00	JOB	9,266	0	0	0	600	9,866	9866.40
3300.30.22.20. Remedial Action Report									
TOTAL Remedial Action Report	1.00	JOB	0	0	0	0	0	0	0.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	24,402	0	0	0	1,800	26,202	26202.40
TOTAL DEMOBILIZATION	1.00	JOB	25,727	372	25	3,350	2,800	32,274	32273.58
TOTAL CAPITAL COSTS	1.00	JOB	2,410,684	186,327	1,927,641	3,022,370	270,715	7,817,736	7817735.97

3400. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400. 1ST YEAR O&M								
3400. 5. GENERAL CONDITIONS								
3400. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	480.00 HR	34,848	0	0	0	0	34,848	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	144.00 HR	10,454	0	0	0	0	10,454	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	104.00 HR	6,178	0	0	0	0	6,178	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	96.00 HR	3,696	0	0	0	0	3,696	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol Officer	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III Health and Safety Manager (CIH)	80.00 HR	8,272	0	0	0	0	8,272	103.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	40.00 HR	4,136	0	0	0	0	4,136	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	12400 MI	0	0	0	0	3,844	3,844	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	24.00 DAY	0	0	0	0	912	912	38.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	8.00 DAY	0	0	0	0	360	360	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	1.00 MO	78,496	0	0	0	5,116	83,612	83612.00
TOTAL GENERAL CONDITIONS	12.00 MO	78,496	0	0	0	5,116	83,612	6967.67

3400.10. SITE FACILITIES/SECURITY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.10. SITE FACILITIES/SECURITY								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Lawn Tractor		0.00	72.50	0.00	0.00	0.00	72.50	
	12.00 MO	0	870	0	0	0	870	72.50
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Security Guard Service 24 hr/ day Working Days		0.00	0.00	0.00	15.00	0.00	15.00	
	8760.00 HR	0	0	0	131,400	0	131,400	15.00
TOTAL SITE FACILITIES/SECURITY	12.00 MO	0	18,330	10,080	167,080	2,880	198,370	16530.83

3400.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.15. HEALTH & SAFETY								
USR AA OVM		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
USR AA CGI		0.00	650.00	0.00	0.00	0.00	650.00	
	12.00 MO	0	7,800	0	0	0	7,800	650.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
TOTAL HEALTH & SAFETY	12.00 MO	0	12,000	0	0	0	12,000	1000.00

3400.20. MATERIALS & SUPPLIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.20. MATERIALS & SUPPLIES								
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	4,080	0	0	4,080	340.00

3400.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Well Redevelopment		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
USR AA Corrective Maintenance		0.00	0.00	0.00	50000.00	0.00	50000.00	
	1.00 LS	0	0	0	50,000	0	50,000	50000.00
TOTAL MAINTENANCE	12.00 MO	0	0	2,000	62,000	0	64,000	5333.33

3400.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.30. UTILITIES Electricity cost assumed at $0.06/kwh. Plant requirements assumed at 160 kwh/hr.								
USR AA Electricity		0.00	0.00	0.00	7000.00	0.00	7000.00	
	12.00 MO	0	0	0	84,000	0	84,000	7000.00
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
TOTAL UTILITIES	12.00 MO	0	0	0	84,000	4,800	88,800	7400.00

COST IMPACTS OF INCREASED UTILITY RATES

	RATE	UNIT	SCENARIO 1	SCENARIO 2	SCENARIO 3	P&T
GAS						
	$7.00	MMBTU	$20,552,203	$30,813,298	$41,081,657	$0
	$10.00	MMBTU	$38,168,055	$57,224,717	$76,294,566	$0
ELECTRICITY						
	$0.10	KWH	$1,754,725	$2,368,444	$4,181,897	$7,939,200
	$0.30	KWH	$10,491,743	$14,210,649	$19,129,337	$47,638,500

NOTE:

1. Total cost increases are for the life cycle of the project with no present value discount. (7 years for all thermal scenarios and 100 years for the P&T option.)
2. Electricity cost increases for the thermal options assume that co-generation covers cost of electrode power requirements (but not GWTP power) for years 1 & 2 of the heatup and the power requirements of the GWTP for years 3 & 4.
   For years 5 thru 7 of the thermal options the power is from the grid.
3. All power for the P&T option is electrical from the grid (no gas).

THE SEATTLE TIMES **LOCAL / REGIONAL** THURSDAY, JUNE 14, 2001

Expect a cap on electrical rates outside California

P-I STAFF AND NEWS SERVICES

WASHINGTON — Federal regulators are expected next week to expand price restrictions on electricity to include Washington state, according to government officials.

According to congressional and industry sources, the Federal Energy Regulatory Commission on Monday is likely to broaden the caps, which it announced in April. They now apply only to California, and only when low power reserves cause a supply emergency.

The restrictions impose ceilings on how much power generators can charge utilities on the wholesale market.

It is unclear what the effect would be on energy prices in Washington state, but electrical and natural-gas prices in California declined after the April order. Although FERC Chairman Curtis Hebert attributed the drop to the limited price controls, Senate Democrats say the reason for the lower prices is uncertain.

Western lawmakers said expanding the price caps to other states and to non-emergency transactions would be a step in the right direction but would still fall short of the extended price caps for which Sen. Patty Murray, D-Wash., and others have been calling.

"It's encouraging that they are going to wake up and smell the coffee and recognize they have a legal responsibility to assure prices are just and reasonable," said Murray's spokesman, Todd Webster. "Senator Murray is hopeful that FERC will come out of hibernation and address the price gouging."

Murray has been pressing FERC to set a two-year price cap that would not apply to any plants currently under construction "but would tamp down on some of these crazy prices being charged," Webster said.

This week, electrical prices on the spot market in California fell to below $100 a megawatt-hour for the first time this year. Natural-gas prices eased, too. Earlier this year, prices frequently surpassed $300 a megawatt-hour, 10 times what they were in precrisis 1999. A megawatt is enough electricity to serve about 600 homes.

"Our price mitigation plan is working," Hebert said yesterday. However, California officials say it is too early to make that claim.

At a Senate hearing yesterday, Sen. Dianne Feinstein, D-Calif., said the reason for recent price drops is unclear, but that "it now appears" FERC will broaden its April order.

The five-member commission of three Republicans and two Democrats has come under attack from Democrats in Congress and from California Gov. Gray Davis. Davis has criticized the limited price caps, calling them inadequate and full of loopholes; he has also charged FERC with being far too timid in curtailing price gouging in the wholesale Western power markets.

The commission regulates wholesale electrical markets and interstate natural-gas pipelines. Under a 1934 law, it is required to ensure prices are just and reasonable.

Hebert, a Republican named chairman by President Bush in January, defended the agency at an energy forum yesterday but also acknowledged the recent criticism: "We're not the most popular people in town right now."

Also yesterday, several economists told a Senate hearing that temporary price controls, if structured properly, should not impede electrical investments and supplies as Republican lawmakers and the administration have argued.

"It is incorrect that regulation necessarily interferes with supplies," Cornell economist Alfred Kahn, a prominent deregulation advocate, told the Senate Governmental Affairs Committee.

Kahn said that if price caps were temporary, exempted new power plants, and provided sufficient profits, "there will be no shortage of people interested and willing to build new power plants."

"The greatest danger is continued chaos," said Paul Joskow, an economist at the Massachusetts Institute of Technology. He, too, urged some price controls based on costs of production.

Sen. Fred Thompson, R-Tenn., said the economists were painting "a rosy picture." He read letters from several Wall Street analysts who insisted that price controls would be a "recipe for disaster" and make investors reluctant to enter the California power market.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

SEATTLE POST-INTELLIGENCER | THURSDAY, JUNE 14, 2001

NATION

POWER

CONTINUED FROM B 1

in April apply only to California markets in emergency situations.

Peak demand prices for electricity on the Mid-Columbia wholesale market — where Northwest utilities buy power — slid below $100 a megawatt-hour June 6 for the first time this year. At times this month they have dipped as low as $36.80.

That's a far cry from the $500 per megawatt-hour some expected for this time of year or the up to $750 per megawatt-hour paid in December.

Prices for natural gas are also tumbling, hitting $3.46 per million British thermal units for gas traded at the hub at Sumas, Whatcom County, yesterday, down from an unprecedented high of $14.20 in January.

The drop in price this spring has been precipitous, with prices falling 23.4 percent from last month to this month, according to Kelley Doolan, natural-gas market specialist for Platts, a division of McGraw-Hill.

Experts cited a range of factors for the wholesale-price drops:

• Weather is the biggest single reason, as well as the largest wild card in the West Coast energy picture. Unusually cool, wet weather has prevailed in recent weeks throughout the West, cutting the usual demand for air conditioning.

• Decline in demand as a result of conservation. Power consumption is down 6.5 percent in California for the three months ending in May compared with the similar period a year ago, adjusted for differences in the weather, according to the California Energy Commission.

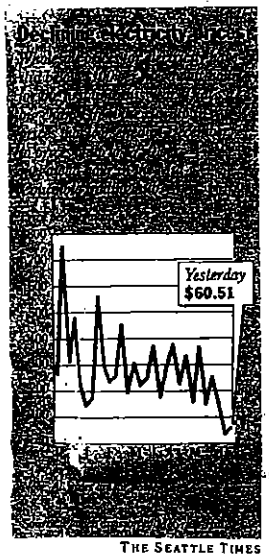
In Washington state, energy experts report a 5 percent reduction in use so far this year. "What we are doing is working," said Ralph Cavanaugh, Northwest energy-program director for the Natural Resources Defense Council an environmental group.

• Decrease in demand by industrial users. Power guzzlers, such as aluminum companies, have unplugged, reducing demand on the grid in the Pacific Northwest.

• Increase in supply. California power plants shut down for spring maintenance in April and May are now back on line for the summer. That put about 15,000 megawatts of generating capacity back on the grid. New power plants have also fired up, including one in Oregon and another in Idaho.

Spring runoff has also added water to Northwest rivers, boosting supply for hydroelectric generation.

Relatively speaking, though,



THE SEATTLE TIMES

wholesale prices for electricity and natural gas are high: gas costs about twice what it did a year and a half ago, and so does electricity. "We are out of the stratosphere, but we haven't landed," said Jim Lazar, an independent energy consultant based in Olympia.

And consumers have yet to see any cut in retail rates.

Gas prices statewide went up by 50 percent this year over last for the average residential customer in response to the jump in wholesale prices.

Electric utilities around the region also raised rates and are forecasting rate increases, not decreases.

While wholesale electricity prices could indeed spike when the water runs low and the temperatures rise, some experts see longer-term relief in natural-gas prices.

Cool weather — which has reduced the demand for power, including gas-fired power generation — has allowed suppliers to put natural gas into storage at record rates.

That means storage could be adequate for the coming winter, Doolan said. New supplies should also be available in time for the coming heating season because of increased drilling.

Electrical supplies from hydropower will also increase if normal rains return to the Northwest this fall. That in turn would decrease reliance on more expensive gas-generated power, dampening the demand and price for natural gas.

Lynda V. Mapes can be reached at 206-464-2736 or lmapes@seattletimes.com.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

URS

Job Mc Cormick & Baxter | Project No. 53-F0074206.03 | Page 1 of 6
Description Stockton Sewer Monthly Discharge Fees | Computed by H. Ehlers | Sheet ___ of ___
Checked by ___ | Date 6/21/01
Date ___
Reference

(1) Fee Structure

✓ Spoke with Larry Williams, City of Stockton, Community Development Department Permit Center (209/937-8436; 209/937-8893 Fax) [Primary Contact for Rate Info; Applications Go to Bob Castelli, 209/937-8719]

* Discharge from M&B would be considered an industrial discharge; See attached schedule for Monthly Discharge Rates.

(2) M&B Flow Assumptions

- 300 GPM Discharge, 24 Hrs/Day, 365 Days/Year.
- Monthly Discharge = (300 GPM)

$$\times \left(\frac{60\ \text{min}}{\text{Hr}}\right)\left(\frac{24\ \text{Hr}}{\text{Day}}\right)\left(\frac{365\ \text{Day}}{\text{Year}}\right)\left(\frac{\text{Year}}{12\ \text{Mths}}\right)$$

$$= 13{,}140{,}000\ \text{Gals/Month}$$

✓ Treat This As Average Discharge. Don't Include A Peaking Factor

(3) M&B Discharge Quality Assumptions

✓ City of Stockton Adds A Surcharge for Biological Oxygen Demand (BOD) and Suspended Solids (SS).

✓ SURCHARGE INCREMENT IS 1,000 POUNDS OF BOD OR SS PER MONTH

* FOR BASE ESTIMATE, ASSUME THE FOLLOWING:

(A) BOD CONCENTRATIONS AT INFLUENT ARE 6 mg/l, AVERAGE [ICF KAISER, JULY 1998, "SOILS AND GROUNDWATER FEASIBILITY STUDY REPORT", APPENDIX D — ATTACHMENT 2]

✓ $6\ mg/l \left(\frac{kg}{1000\ mg}\right)\left(\frac{LBS}{2.2\ kg}\right)$

$\times \left(\frac{3.78\ l}{GAL}\right)\left(13{,}140{,}000\ \frac{GAL}{MONTH}\right)$

$= 135{,}462\ \frac{LBS\ BOD}{MONTH}$

✓ ASSUME BOD IS REDUCED BY INCIDENTAL SEPARATION/FILTRATION AND GRANULAR ACTIVATED CARBON TO 1% OF INFLUENT (i.e., 99% REDUCTION)

$= 1{,}355$ LBS/MONTH

∴ CALL IT 2,000 LBS/MTH

(B) SS CONCENTRATIONS AT INFLUENT ARE 45 mg/l [ICF KAISER, SAME AS BOD SOURCE]

URS

Job _____ Project No. _____ Sheet ____ of ____

Description _____ Computed by _____ Date _____

Checked by _____ Date _____

Reference

$$45\ mg/l \left(\frac{Kg}{1000\ mg}\right)\left(\frac{LBS}{2.2\ Kg}\right) \times \left(\frac{3.78\ l}{GAL}\right)\left(13{,}140{,}000\ \frac{GAL}{MTH}\right) = 1{,}015{,}960\ LBS/MTH$$

ASSUME SS IS REDUCED BY SEPARATION/SETTLING, FILTRATION & GAC TO 0.5% OF INFLUENT (99.5% REMOVAL)

= 5,080 LBS/MTH

∴ CALL IT 5,000 LBS/MTH

(4) M&B MONTHLY DISCHARGE FEE AS INDUSTRIAL DISCHARGE

	# BASIS	QUANTITY	MTHLY COST
CUSTOMER CHARGE	FLAT MTHLY FEE (# 207.33)	1	# 207.
FLOW CHARGE — COLLECTION	#14,465 PER EACH 1 MILLION GALLONS	13.14 MG	#190,070
FLOW CHARGE — TREATMENT	$89,044.22 PER EACH 1 MILLION GALLONS	13.14 MG	$1,170,041
		SUBTOTAL	#1,360,318

URS

Job _____ Project No. _____ Sheet ____ of ____

Description _____ Computed by _____ Date _____

_____ Checked by _____ Date _____

Reference

	$ BASIS	QUANTITY	MTHLY COST
BOD SURCHARGES	$38,711.31 PER 1,000 LBS	2,000 LBS	$77,423
SS SURCHARGES	$17,469.30 PER 1,000 LBS	5,000 LBS	$87,347
		TOTAL MTH CHARGE	$1,525,088

ANNUAL DISCHARGE FEE TO CITY = $18,301,056

* EQUIVALENT COST/GALLON

= $0.116/GALLON

5/6

COMMERCIAL

A. RESIDENTIAL STRENGTH	Not less than one SFDU equivalent rate plus an additional SFDU equivalent rate for each multiple or portion thereof as calculated from guidelines in attached Sewer Connection Fee Charges.
B. MORE THAN RESIDENTIAL STRENGTH	Case by case, as calculated.
INDUSTRIAL	Case by case, as calculated.

Based on Estimated Maximum Monthly Loadings for Monitored Accounts.

Customer Charge	$ 207.33
FLOW (in million gallons)/mo. for treatment	89,044.22
FLOW (in million gallons)/mo. for collection	14,465.00
BOD (in 1,000 lbs)/mo.	38,711.31
SS (in 1,000 lbs)/mo.	17,469.30

VI. SEWER CONNECTION FEE CHARGES

A. NEW STRUCTURES

a. The basis of sewer connection charges prescribed in these regulations is a unit of cost referred to as the "connection charge" computed to represent the cost of providing capital for treatment and disposal from a single family dwelling unit. Sewage from an average single family dwelling is deemed to include a projected average of 300 gallons/day of flow with 175 milligrams/liter BOD and 375 milligrams/liter SS.

b. Dwelling Units Defined: A single family dwelling unit is defined to mean and to refer to a place of residence for a single family, including mobile homes and condominiums. Multiple family dwellings are defined as duplexes, triplexes and apartments.

c. Single family dwelling unit (SFDU) equivalents other than flow and strength factors designated in (a) above which may be used to determine connection charges are:

1. 1,500 ft^2 - one single family dwelling unit.

6/6

CITY HALL

COMMUNITY DEVELOPMENT DEPARTMENT

PERMIT CENTER

STOCKTON, CA 95202-1997

FAX NO. (209) 937-8893

DATE: 6-21-01

TO: Harry Ehlers - 661 322 6552

FROM: Larry Williams PHONE NO. (209) 937- 8436

SUBJECT: Sewer connection rate schedule

Number of copies transmitted is 2 including this cover page.

COMMENTS:

See attached sheet.

MAILING ADDRESS: 425 N. EL DORADO ST

PHYSICAL ADDRESS: 345 N. EL DORADO ST

3400.35. SITE O&M LABOR & MISC EQUIPME	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA Senior Engineer/Scientist II;		53.13	0.00	0.00	0.00	0.00	53.13	
GWTP Plant Manager	2500.00 HR	132,825	0	0	0	0	132,825	53.13
USR AA Engineer/Scientist IV - Plant		43.47	0.00	0.00	0.00	0.00	43.47	
Operator	2500.00 HR	108,675	0	0	0	0	108,675	43.47
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P		0.00	7.52	0.00	0.00	0.00	7.52	
KUP	2080.00 HR	0	15,646	0	0	0	15,646	7.52
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	241,500	15,646	0	0	0	257,146	21428.80

3400.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.40. CHEMICALS								
GAC cost for bioreactor per US Filter assumptions is 2.26 lb/day or 825 lbs/year.								
GAC replacement quantity for the carbon polishing system is 1/2 of the Carbonaire quote assumptions since they did not take into account the bioreactor ahead of the carbon vessels. Carbonaire came up with breakthrough in 100 days with quantity of 10,000 lbs. Assuming breakthrough of 200 days this is a replacement quantity of 18,250 lbs/year.								
USR AA GAC (Liquid) for Bioreactor		0.00	0.00	0.95	0.00	0.00	0.95	
	825.00 LB	0	0	784	0	0	784	0.95
USR AA GAC (Liquid) for Polishing Un its		0.00	0.00	0.95	0.00	0.00	0.95	
	18250 LB	0	0	17,338	0	0	17,338	0.95
USR AA O2 for Bioreactor		0.00	0.00	4.67	0.00	0.00	4.67	
	365.00 DAY	0	0	1,705	0	0	1,705	4.67
USR AA Nutrients for Bioreactor		0.00	0.00	14.30	0.00	0.00	14.30	
	365.00 DAY	0	0	5,220	0	0	5,220	14.30
TOTAL CHEMICALS	12.00 MO	0	0	25,045	0	0	25,045	2087.11

3400.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.45. DISPOSALS								
3400.45. 5. SLUDGE								
USR AA Manifesting Samples, Sludge, Carbon		0.00	0.00	0.00	886.00	0.00	886.00	
	1.00 EA	0	0	0	886	0	886	886.00
USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	22.00 CY	0	0	0	880	0	880	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	33.00 TON	0	0	0	1,980	0	1,980	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	3,746	0	6,746	562.17
3400.45.15. CARBON (GAC, LIQUID PHASE)								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	19075 LBS	0	0	0	8,775	0	8,775	0.46
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,775	0	8,775	731.21
3400.45.20. PPE & MISC								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
3400.45.25. OILY WASTE								
USR AA Waste Characterization - Ful l TCLP & Waste Char. for Carbon (liquid and vapor) and sludge.		0.00	0.00	0.00	0.00	665.00	665.00	
	2.00 EA	0	0	0	0	1,330	1,330	665.00
USR AA Oily Waste		0.00	0.00	0.00	1.98	0.00	1.98	
	8000.00 GAL	0	0	0	15,840	0	15,840	1.98
TOTAL OILY WASTE	12.00 MO	0	0	0	15,840	1,330	17,170	1430.83
TOTAL DISPOSALS	12.00 MO	0	3,000	0	30,361	1,330	34,691	2890.88

Harry Ehlers
10/24/01 10:29 AM

To: John Spear/Cranford/URSCorp@URSCORP
cc: Michael.M.Bailey@nws02.usace.army.mil
Subject: NAPL removal during P&T – assumption for final cost estimate document

Jack,

I spoke with Mike Bailey this morning about the NAPL recovery assumption that will be used for the final pump & treat cost estimate. Mike and I talked about the estimated quantity of recoverable NAPL identified in SteamTech's conceptual design document (1 million gallons) and the yearly NAPL disposal quantity used in the July 1998 Soil and Groundwater Feasibility Study Report prepared for EPA by ICF Kaiser (20,000 gallons per year, 30 years of recovery -- 600,000 gallons recovered). The draft cost estimate for the pump & treat scenario prepared by URS used 10,000 gallons per year for both the 30 year and 100 year estimate (300,000 and 1 million gallons, respectively). Mike and I agreed that approach probably overstates what could be possible for a pump-&-treat system.

The enclosed information from Mike Bailey (see the Excel spreadsheet in Mike's 10/23 e-mail) seems more reasonable for our purposes, with a cumulative recovery of 100,000 gallons (10% of the estimated 1 million gallons of recoverable NAPL present) over 100 years of operation. I amended Mike Bailey's spreadsheet to reflect an incremental decrease in the quantity of NAPL disposed of in 5 year increments from Year 1 through 20, then flat-lined recovery for Years 21 through 100. This will allow the estimate to reflect higher initial recovery and disposal costs in the early years of operation, and reduced recovery in the later years. Please look over the spreadsheet and modify the O&M estimates for the P&T alternative. We will need to include this memo in the final estimate as part of our assumptions/backup documentation.

Harry Ehlers, PE, Project Engineer
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
Harry_Ehlers@urscorp.com
206/438-2700 (office)
206/438-2699 (fax)

Assumed P&T NAPL removal - final estima

—— Forwarded by Harry Ehlers/Seattle/URSCorp on 10/24/01 08:58 AM ——

"Bailey, Michael M NWS" <Michael.M.Bailey@nws02.usace.army.mil>
10/23/01 11:45 AM

To: "'Harry Ehlers'" <Harry_Ehlers@urscorp.com>
cc: "Lynch, Kira P NWS" <Kira.P.Lynch@nws02.usace.army.mil>
Subject: NAPL removal during P&T

Harry,

Kira said you were looking for ways to revise the estimate of NAPL removal during P&T. The attached Excel file has one approach. Realistically, you'd probably expect to see diminishing returns as time goes on, so the spreadsheet assumes removing 10% less each year. The starting point is assumed to be 10,000 gallons (1% of total volume), and the total amount removed over 100 years is essentially 100,000 gallons (10%). The numbers are not based on actual results at NAPL P&T sites; they're somewhat arbitrary. Any thoughts?

Mike

<<P&T NAPL removal estimate.xls>> P&T NAPL removal estimate.:

McCormick Baxter Pump Treat Cost Estimate
NAPL Recovery Assumptions for Final Estimate

Note: This spreadsheet is adapted from the analysis performed by Mike Bailey, USACE - Seattle District, on 10/23/2001. The numbers indicated below will be used for the final cost estimate for the pump & treat alternative.

Prepared by: Harry Ehlers, URS Date: 10/24/2001

Year	Gal NAPL		Subtotals		Aver Gal/Yr
1	10000.0				
2	9000.0				
3	8100.0				
4	7290.0				
5	6561.0	subtotal 1 to 5 =	40951.0	Aver gal/yr =	8190.2
6	5904.9				
7	5314.4				
8	4783.0				
9	4304.7				
10	3874.2	subtotal 6 to 10 =	24181.2	Aver gal/yr =	4836.231
11	3486.8				
12	3138.1				
13	2824.3				
14	2541.9				
15	2287.7	subtotal 11 to 15 =	14278.7	Aver gal/yr =	2855.746
16	2058.9				
17	1853.0				
18	1667.7				
19	1500.9				
20	1350.9	subtotal 16 to 20 =	8431.4	Aver gal/yr =	1686.29
21	1215.8			subtotal 1 to 20 =	87842.3
22	1094.2				
23	984.8			Remaining for 20 to100 operations =	12157.7
24	886.3			Aver gal/yr =	151.9708
25	797.7				
26	717.9				
27	646.1				
28	581.5				
29	523.3				
30	471.0				
31	423.9				
32	381.5				
33	343.4				

***** Assume for final P&T cost estimate ******

Year 1 to 5 NAPL recovery (gal/yr) =	8,000	[40,000 gallons recovered]
Year 6 to 10 NAPL recovery (gal/yr) =	5,000	[25,000 gallons recovered]
Year 11 to 15 NAPL recovery (gal/yr) =	3,000	[15,000 gallons recovered]
Year 16 to 20 NAPL recovery (gal/yr) =	1,500	[7,500 gallons recovered]
Year 21 to 100 NAPL recovery (gal/yr) =	156	[100,000 - 87,500 = 12,500 gallons remaining]

34	309.0
35	278.1
36	250.3
37	225.3
38	202.8
39	182.5
40	164.2
41	147.8
42	133.0
43	119.7
44	107.8
45	97.0
46	87.3
47	78.6
48	70.7
49	63.6
50	57.3
51	51.5
52	46.4
53	41.7
54	37.6
55	33.8
56	30.4
57	27.4
58	24.7
59	22.2
60	20.0
61	18.0
62	16.2
63	14.6
64	13.1
65	11.8
66	10.6
67	9.6
68	8.6
69	7.7
70	7.0
71	6.3
72	5.6
73	5.1
74	4.6
75	4.1
76	3.7
77	3.3
78	3.0
79	2.7
80	2.4
81	2.2
82	2.0
83	1.8
84	1.6
85	1.4
86	1.3
87	1.2
88	1.0
89	0.9

90	0.8
91	0.8
92	0.7
93	0.6
94	0.6
95	0.5
96	0.4
97	0.4
98	0.4
99	0.3
100	0.3
	99997.3 * Assume cumulative removal is 100,000 gallons over 100 years.

MIKE BAILEY'S 10/23/2001
SPREADSHEET — NAPL
RECOVERY FOR PUMP & TREAT
SYSTEM OVER 100 YEARS.

URS CORPORATION

Year	Gal NAPL
1	10000.0
2	9000.0
3	8100.0
4	7290.0
5	6561.0
6	5904.9
7	5314.4
8	4783.0
9	4304.7
10	3874.2
11	3486.8
12	3138.1
13	2824.3
14	2541.9
15	2287.7
16	2058.9
17	1853.0
18	1667.7
19	1500.9
20	1350.9
21	1215.8
22	1094.2
23	984.8
24	886.3
25	797.7
26	717.9
27	646.1
28	581.5
29	523.3
30	471.0
31	423.9
32	381.5
33	343.4
34	309.0
35	278.1
36	250.3
37	225.3
38	202.8
39	182.5
40	164.2
41	147.8
42	133.0
43	119.7
44	107.8
45	97.0
46	87.3
47	78.6
48	70.7
49	63.6
50	57.3

51	51.5
52	46.4
53	41.7
54	37.6
55	33.8
56	30.4
57	27.4
58	24.7
59	22.2
60	20.0
61	18.0
62	16.2
63	14.6
64	13.1
65	11.8
66	10.6
67	9.6
68	8.6
69	7.7
70	7.0
71	6.3
72	5.6
73	5.1
74	4.6
75	4.1
76	3.7
77	3.3
78	3.0
79	2.7
80	2.4
81	2.2
82	2.0
83	1.8
84	1.6
85	1.4
86	1.3
87	1.2
88	1.0
89	0.9
90	0.8
91	0.8
92	0.7
93	0.6
94	0.6
95	0.5
96	0.4
97	0.4
98	0.4
99	0.3
100	0.3
	99997.3

John Spear
10/26/01 12:08 PM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Calculation of T&D costs

Harry, I think I copied you on the quote from Clean Harbors. If not let me know. This is a dressed up version of my calculations.

Jack

T&D calculations.xls

McCORMICK & BAXTER

10/25/01

CALCULATIONS OF T&D COSTS BASED ON QUOTE FROM CLEAN HARBORS
USED IN THE CD ESTIMATES

CARBON (GAC) DISPOSAL COSTS	QUOTED UNIT COSTS	VAPOR PH	LIQUID PHASE
Disposal (per pound)		0.350	0.290
Transportation			
Cost per load	4,435.00		
(say 30,000#/load			
Cost per pound		0.148	0.148
RO/RO Rental			
(say 30 days/load)	270.00		
Cost per pound		0.009	0.009
Liner	50.00		
Cost per pound		0.002	0.002
Haz Fee	1.92/ton	0.001	0.001
TOTALS		0.509	0.450
	Say for est.	0.520 per #	0.460

NAPL DISPOSAL COSTS		
Disposal 0.12/# at 8.5#/gal		1.020
Transportation		
Cost per load	4,620.00	
(5000 gal/load		
Cost per gallon		0.924
Loading/Unloading Demurrage		
Say 2 hours extra/loac	170.00	0.034
TOTALS		1.978
	Say for est.	1.980 per gal

John Spear
10/25/01 10:11 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Clean Harbors T&D Quote

Harry,
Here is the quote from Clean Harbors for your backup.
Jack
—— Forwarded by John Spear/Cranford/URSCorp on 10/25/2001 01:17 PM ——

rowlandd@cleanharbors.com (Rowland, Dave)
10/24/2001 06:14 PM

To: "'john_spear@urscorp.com'" <john_spear@urscorp.com>
cc:
Subject: Stockton project

John;

I hope this helps. Call me with any questions

<<URS- CA NJ.doc>>

Dave Rowland
Clean Harbors Environmental Services
800-462-4678 Ext 228

URS- CA NJ.doc

July 3, 2001

URS Corporation
12 Commerce Drive
Cranford, NJ 07016
Attn. Jack Spear

Re: Budgetary numbers- Creosote Liquids

Dear Jack

Thank you for the opportunity to provide this budgetary estimate for the transportation and disposal of Creosote contaminated liquids coming from your California site. Although this project is merely in the planning stages, the cost estimates below should assist in your planning efforts.

Similar to wastes generated at other remediation sites, Clean Harbors (CHES) is familiar with ceosote contamination and we are looking forward to further discussions pertinent to this project. As you move forward, please don't hesitate to contact me with any questions you may have.

As mentioned, Creosote contaminated waste is suitable for incineration at our RCRA/CERCLA approved incinerator in Kimball, NE. Because of its relative proximity to the site, and our ability to receive both liquids and solids via rail, Kimball offers significant advantages over other disposal sites.

In the past two years, our Kimball, NE fluidized- bed incinerator has undergone several improvements that have led to record breaking incineration levels. Since our initial purchase of the incinerator in 1995, CHES has enhanced the feed and processing capabilities, added shredders and permitted pad storage space, replaced refractory linings and has recently completed construction of our second of six permitted monofills. These improvements will enable CHES to continue to incinerate wastes well into the millenium.

The inherent design of a fluidized bed incinerator enables CHES to offer aggressive pricing to customers requiring incineration of bulk solids, sludges and liquids. Additionally, Kimball is the <u>only</u> incinerator in the United States that is capable of delisting the ash produced from the incineration process, virtually eliminating long-term liability associated with hazardous waste landfills.

Attached you will find transportation and disposal pricing based upon the general knowledge of contaminated material from previous projects.

Our fleet of transportation equipment, coupled with our selected subcontracted transportation companies enables Clean Harbors to transport a variety of hazardous wastes without offloading demurrage, often reducing demurrage costs with a streamlined coordination effort. For this project we can utilize 5,000 gallon vacuum trailers from our Kimball site or Thousand Oaks, CA location. Further, we may utilize local approved subcontractors for proper transportation of your waste.

As you move forward with the planning of this project please contact us with any planning or logistical questions you may have. We are eager to work with you and will be contacting you soon to follow up on this quotation. If you have any questions in the meantime, please contact us at the Denver office at 1-800-462-4678 Ext, 228.

Sincerely,

Dave Rowland

Senior Account Manager

URS Corporation July 3, 2001

I. DISPOSAL:

a. **Creosote contaminated Liquids** **$0.08-$0.16/lb/lb.**
Minimum charge applies per load

General Specifications

FB1K BULK LIQUID/ENERGETIC FOR KIMBALL
BTU 6,000 - 10,000/lb
Metals within normal feed rates
Halogen less than 5%
Sulfur less than 3%
No pesticides/level A requirements
Na/K/Mg/P each less than .5%
Ash less than 5%
Settleable solids less than 5%
Viscosity of #4 fuel oil or better
PRIMARY DISPOSAL METHOD: DESTRUCTION INCINERATION

b. **Creosote Contaminated Carbon- Vapor Phase**
$0.34- $0.36/lb-
Bulk Quantity

c. **Creosote Contaminated Carbon- Liquid Phase**
$0.26 - $0.32/lb
Bulk Quantity

General Specifications

FB5 SOLID FUEL NOT PROCESSABLE (DEBRIS)
Less than 10% metal pieces
All metal pieces less than 6 inches longest dimension
No metal fines
Less than 30% inorganic material
Less than 10% halogens
Less than 50 ppm PCB's, non-TSCA regulated
Less than 4% sulfur
Greater than 5000 BTU's/lb
No pesticides
Non-dispersible solids (e.g. cured resins, rags, filters)
PRIMARY DISPOSAL METHOD: FUELS BLENDING

II. TRANSPORTATION

From Stockton to Kimball

a.	**Liquids to Kimball**	$4,620.00 per load Loading time: 2hrs $85.00/hr thereafter
b.	**Rolloffs to Kimball**	$4,435.00/load
c.	**Spot Fee**	TBD
d.	**Roll-off Rental**	$9.00/Day
e.	**Roll-off Liner**	$50.00/each

NOTE- scheduling of roll-off wastes into Kimball is most efficient when performed in a drop and swap mode. CHES will provide an empty roll-off to each driver upon delivery of full box.

III. State Hazardous Fee: NE- $1.92/Ton

IV. Analysis:

Basic Waste Approval fee	$75.00- WAIVED UPON FIRST SHIPMENT (Specific analysis, if needed will be additional)

The aforementioned prices are based upon the following conditions & assumptions:

1. Estimate prices only for budgetary needs
2. This project will commence upon agreement of Terms and conditions and a purchase order.
3. CHES will negotiate a mutually agreeable delivery schedule upon award.
4. Materials subject to additional charges if they do not conform to the listed specifications.
5. All containers must be marked with a CHES profile number
6. Client will provide free and clear access to work area for equipment and manpower.
7. Due to recent escalating fuel costs, a temporary 3% OPEC fuel surcharge will be added to each invoice.

We are very proud of our excellent compliance record. When outside disposal services are necessary, CHES only ships to facilities that pass our annual compliance audit, in addition to any disposal restrictions the generator may have. Our fleet of trucks is inspected daily to assure you of safe and dependable transportation of your hazardous waste. In addition, each truck is fitted with a satellite tracking system that enables constant communication with our dispatch personnel.

Finally, we offer waste tracking for all of your wastes through our on-line tracking system. This service is offered on a monthly, quarterly or yearly basis or is available on our Web site at www.Clean Harbors.com. Pricing is firm for 30 days and terms are NET15 commencing the last day of work being performed at the job site listed on the invoice.

Should you have any questions or need additional information, please contact me at 1-800-462-4678 in our Denver Service Center. We sincerely appreciate this opportunity to quote on your waste disposal services.

Metals Feed Limits- ppm

Antimony (Sb)	1,155
Arsenic (As)	75
Barium (Ba)	4,050
Beryllium (Be)	10
Cadmium (Cd)	100
Chromium (Cr)	1,000
Lead (Pb)	7,995
Mercury (Hg)	10.0
Nickel (Ni)	12,450
Selenium (Se)	255
Silver (Ag)	255
Thallium (Tl)	37.5

NOTE:
Wastes must not qualify as Inorganic Metal Bearing Wastes, which EPA prohibits from incineration

Table 7-1
Estimates of GAC Consumption by Liquid Stream Treatment

Visalia data used for scaling				
Liquid pumping rate	400	gpm		
First 6 months average	23,333	lbs/month		
Second year average	16,667	lbs/month		
Third year average	8,333	lbs/month		
Pump-and treat usage	1,667	lbs/month		
McCormick-Baxter estimates	Scenario 1	Scenario 2	Scenario 3	
Pumping rate	475	575	700	gpm
Montly usage 1st yr	27,708	33,542	40,833	lbs/month
Montly usage 2nd yr	23,750	28,750	35,000	lbs/month
Montly usage 3rd yr	14,844	17,969	21,875	lbs/month
Montly usage 4th yr	9,896	11,979	14,583	lbs/month
Usage during cooldown yr 1	5,938	7,188	8,750	lbs/month
Usage during cooldown yr 2	3,958	4,792	5,833	lbs/month
Usage during cooldown yr 3	1,979	2,396	2,917	lbs/month
Estimated total, sacrificial	1,056,875	1,279,375	1,557,500	lbs
Changeout frequency, 10,000 lb primary vessels (times per year)				
Year 1	33	40	49	times
Year 2	29	35	42	times
Year 3	18	22	26	times
Year 4	12	14	18	times
Year 5	7	9	11	times
Year 6	5	6	7	times
Year 7	2	3	4	times
Estimated regeneration frequency (times per month)[1]				
Year 1	6	7	8	times
Year 2	5	6	7	times
Year 3	3	4	4	times
Year 4	2	2	3	times
Year 5	1.2	1.4	1.8	times
Year 6	0.8	1.0	1.2	times
Year 7	0.4	0.5	0.6	times
Estimated carbon usage using regeneration on-site[2]				
Year 1	33,250	40,250	49,000	lbs
Year 2	28,500	34,500	42,000	lbs
Year 3	17,813	21,563	26,250	lbs
Year 4	11,875	14,375	17,500	lbs
Year 5	7,125	8,625	10,500	lbs
Year 6	4,750	5,750	7,000	lbs
Year 7	2,375	2,875	3,500	lbs
Estimated total, regeneration on-site	105,688	127,938	155,750	lbs
1) Assumed that the vessels are regenerated when they are 50% loaded				
2) The carbon will be replaced after 20 regeneration cycles				

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.50. SAMPLING & ANALYSIS								
3400.50. 5. PERFORMANCE MONITORING 3 sampling points for all analyticals listed except PAH's and PCP's which are only 1 sampling point. All sampling done weekly except dioxins/furans which are done semi-annually.								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	20.00 EA	0	0	80	0	0	80	4.00
AIR AA Plastic Sheeting (Per Roll)		0.00	0.00	16.00	0.00	0.00	16.00	
	8.00 EA	0	0	128	0	0	128	16.00
AIR AA Deionized Water		0.00	0.00	10.00	0.00	0.00	10.00	
	40.00 GAL	0	0	400	0	0	400	10.00
AIR AA Alconox Soap		0.00	0.00	11.00	0.00	0.00	11.00	
	12.00 EA	0	0	132	0	0	132	11.00
M HTW AA Shipping Samples to Lab		0.00	0.00	50.00	0.00	0.00	50.00	
	160.00 EA	0	0	8,000	0	0	8,000	50.00
HTW AA 48 Quart Ice Chest		0.00	0.00	20.65	0.00	0.00	20.65	
	50.00 EA	0	0	1,033	0	0	1,033	20.65
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	50.00 EA	0	0	251	0	0	251	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	58.00 EA	0	0	17,641	0	0	17,641	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	172.00 EA	0	0	0	9,460	0	9,460	55.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	58.00 EA	0	0	0	8,990	0	8,990	155.00
M HTW AA Chemical Oxygen Demand (COD)		0.00	0.00	0.00	33.00	0.00	33.00	
	172.00 EA	0	0	0	5,676	0	5,676	33.00
M HTW AA Biochemical Oxygen Demand		0.00	0.00	0.00	38.00	0.00	38.00	
	172.00 EA	0	0	0	6,536	0	6,536	38.00
M HTW AA TOC		0.00	0.00	0.00	55.00	0.00	55.00	
	172.00 EA	0	0	0	9,460	0	9,460	55.00
M HTW AA TPH EPA 418.1 test for total petroleum hydrocarbons by gas		0.00	0.00	0.00	60.00	0.00	60.00	
	58.00 EA	0	0	0	3,480	0	3,480	60.00

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
chromatography using procedure 8015 Mod. as detailed in EPA SW-846)								
M HTW AA Suspended Solids		0.00	0.00	0.00	17.00	0.00	17.00	
	172.00 EA	0	0	0	2,924	0	2,924	17.00
M HTW AA Dissolved Solids		0.00	0.00	0.00	17.00	0.00	17.00	
	172.00 EA	0	0	0	2,924	0	2,924	17.00
TOTAL PERFORMANCE MONITORING	1.00 MO	0	0	27,665	49,450	0	77,115	77114.78
3400.50.10. COMPLIANCE MONITORING								
3400.50.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.50.10.15. WASTE DISPOSAL CHARACTERIZATION								
3400.50.10.15. 5. NAPL								
M HTW AA TAL Metals (As, Cu, Cr, Zn)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
M HTW AA TPH EPA 418.1 test for total petroleum hydrocarbons by gas chromatography using procedure 8015 Mod. as detailed in EPA SW-846)		0.00	0.00	0.00	60.00	0.00	60.00	
	5.00 EA	0	0	0	300	0	300	60.00
AIR AA Semivolatile Organics (8270)		0.00	0.00	510.00	0.00	0.00	510.00	
	5.00 EA	0	0	2,550	0	0	2,550	510.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	1.00 EA	0	0	4	0	0	4	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
TOTAL NAPL	12.00 MO	0	0	2,970	500	0	3,470	289.17
3400.50.10.15.10. SOLIDS (WELLS)								
USR AA TCLP (Leachate analyzed for As, Cr, & SVOC's)		0.00	0.00	0.00	740.00	0.00	740.00	
	5.00 EA	0	0	0	3,700	0	3,700	740.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
TOTAL SOLIDS (WELLS)	12.00 MO	0	0	424	3,700	0	4,124	343.67

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.50.10.15.15. SOLIDS (SPENT GAC)								
USR AA TCLP (Leachate analyzed for A s, Cr, & SVOC's)	5.00 EA	0.00 0	0.00 0	0.00 0	740.00 3,700	0.00 0	740.00 3,700	740.00
AIR AA Packing Tape Per Roll	1.00 EA	0.00 0	0.00 0	4.00 4	0.00 0	0.00 0	4.00 4	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00 0	0.00 0	5.02 20	0.00 0	0.00 0	5.02 20	5.02
TOTAL SOLIDS (SPENT GAC)	12.00 MO	0	0	420	3,700	0	4,120	343.34
3400.50.10.15.20. SOLIDS (BIOSOLIDS & SLUDGES)								
USR AA TCLP (Leachate analyzed for A s, Cr, & SVOC's)	5.00 EA	0.00 0	0.00 0	0.00 0	740.00 3,700	0.00 0	740.00 3,700	740.00
AIR AA Packing Tape Per Roll	1.00 EA	0.00 0	0.00 0	4.00 4	0.00 0	0.00 0	4.00 4	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00 0	0.00 0	5.02 20	0.00 0	0.00 0	5.02 20	5.02
TOTAL SOLIDS (BIOSOLIDS & SLUDGES)	12.00 MO	0	0	420	3,700	0	4,120	343.34
3400.50.10.15.25. SOLIDS (SPENT FILTER MEDIA)								
USR AA TCLP (Leachate analyzed for A s, Cr, & SVOC's)	5.00 EA	0.00 0	0.00 0	0.00 0	740.00 3,700	0.00 0	740.00 3,700	740.00
AIR AA Packing Tape Per Roll	1.00 EA	0.00 0	0.00 0	4.00 4	0.00 0	0.00 0	4.00 4	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
TOTAL SOLIDS (SPENT FILTER MEDIA)	12.00 MO	0	0	420	3,700	0	4,120	343.34
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	4,654	15,300	0	19,954	1662.87
3400.50.10.20. GWTP DISCHARGE TO MORMON SLOUGH								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	14.00 EA	0	0	0	13,300	0	13,300	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	14.00 EA	0	0	1,386	0	0	1,386	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	14.00 EA	0	0	70	0	0	70	5.02
HTW AA Suspended Solids		0.00	0.00	10.00	0.00	0.00	10.00	
	14.00 EA	0	0	140	0	0	140	10.00
HTW AA Dissolved Solids		0.00	0.00	10.00	0.00	0.00	10.00	
	14.00 EA	0	0	140	0	0	140	10.00
TOTAL GWTP DISCHARGE TO MORMON SLOU	12.00 MO	0	0	1,744	18,830	0	20,574	1714.52

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.50.10.25. SAMPLING TECHNICIANS								
3400.50.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per sampling event. Assume semi-annual sampling.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	320.00 HR	19,008	0	0	0	0	19,008	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	320.00 HR	10,560	0	0	0	0	10,560	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	1200.00 MI	0	0	0	0	372	372	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	40.00 DAY	0	0	0	0	7,920	7,920	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	40.00 DAY	0	0	0	0	1,680	1,680	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	29,568	0	1,000	0	9,972	40,540	10135.00
3400.50.10.25.10. GW MONITORING REPORT Report done twice yearly.								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	320.00 HR	21,472	0	0	0	0	21,472	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	160.00 HR	11,616	0	0	0	0	11,616	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	64.00 HR	3,098	0	0	0	0	3,098	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	64.00 HR	2,464	0	0	0	0	2,464	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	38,650	0	0	200	2,000	40,850	10212.40

3400.50. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING TECHNICIANS	12.00 MO	68,218	0	1,000	200	11,972	81,390	6782.47
TOTAL COMPLIANCE MONITORING	12.00 MO	68,218	0	10,351	105,005	11,972	195,546	16295.49
TOTAL SAMPLING & ANALYSIS	12.00 MO	68,218	0	38,016	154,455	11,972	272,661	22721.72

3400.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
3400.55. QC & ANALYTICAL DATA VALIDATION								
3400.55. 5. DATA VALIDATION								
3400.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	600.00 HR	35,640	0	0	0	0	35,640	59.40
TOTAL PROCESS SAMPLES	1.00 MO	35,640	0	0	0	0	35,640	35640.00
3400.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	1.00 QTR	5,940	0	0	0	0	5,940	5940.00
3400.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	20.00 HR	1,188	0	0	0	0	1,188	59.40
TOTAL AIR MONITORING SAMPLES	1.00 MO	1,188	0	0	0	0	1,188	1188.00
3400.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	1.00 MO	5,940	0	0	0	0	5,940	5940.00
TOTAL DATA VALIDATION	1.00 MO	48,708	0	0	0	0	48,708	48708.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	48,708	0	0	0	0	48,708	4059.00
TOTAL 1ST YEAR O&M	12.00 MO	436,922	48,976	79,221	497,896	26,098	1,089,112	90759.33
TOTAL McCORMICK&BAXTER SUPERFUND SI	1.00 EA	2,847,606	235,303	2,006,862	3,520,265	296,813	8,906,848	8906847.94

Kathryn Carpenter
06/29/01 07:57 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP, Wendy LS Oresik/Seattle/URSCorp@URSCORP, John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: M&B CD Compliance Monitoring analytical unit costs

Good Morning,

Here is a spreadsheet with unit costs for soil/solid, NAPL, GW, and air/vapor samples. Let me know if I missed anything or you need more backup. One thing we need to figure out is how to monitor for ozone. Can this be done with an onsite monitor? The AirToxics lab does not do this test so I suspect it needs to be done in the field.

compliance monitoring analysis unit cost

Kathryn A. Carpenter, MS
Senior Environmental Chemist
URS Corporation
1501 4th Ave., Suite 1400
Seattle, WA 98101-1616
(206) 438-2053 (phone)
(206) 438-2699 (fax)

Analyte	Method	NAPL	Soil/Solids	GW	Air/Vapor
TOC	9060			$55	
TPH	TPH-Dx	$87	$70	$60	
PAHs *	8310	$203	$161	$140	$220
PCP *	8270 mod	$225	$180	$155	$200
Metals (As, Cu, Cr, Zn)	6000/7000		$45	$40	
TCLP (metals, VOC, SVOC)	TCLP		$740		
Dioxin/Furans	8290			$950	
Natural Attenuation Parameters (dissolved methane, ethane, ethene)	RSK 175			$75	
TO13 (SVOC compounds)	TO13				$275
Carbon dioxide	ASTM D-1946				$115
Carbon monoxide	ASTM D-1946				incl.
Sulfur oxides	ASTM D-1946				$150
NO2	ASTM D-1946				incl.
O3	TBD				TBD
VOC	ASTM D-1946				$220
PM10	PM10				$35

References:
Unit costs for NAPL, soil/solids, and GW from URS Cost Estimating Database (June 2001)
Unit costs for air/vapor from AirToxics
* PCP and PAHs for air/vapor included in TO13 - this price is for reporting PCP or PAHs only

Table 3-2
Groundwater Pump-and-Treat Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total Per Event
Performance Monitoring—Groundwater Pump-and-Treat System					
NAPL/Groundwater	NAPL/Water	Flow	Continuous	43	N/A
Recovery Rate		Volume	Continuous	43	N/A
Groundwater Monitoring[a]	Water	TOC	Initial ops	43	43
		PAHs	Initial ops	43	43
		PCP	Initial ops	43	43
		Metals[b]	Initial ops	43	43
		Dioxins/furans	Initial ops	10	10
Well installation (soil)[a,d]	Soil	TPH	Initial constr.	43	100
		PAHs	Initial constr.	43	100
		PCP	Initial constr.	43	100
Groundwater Treatment Plant Monitoring[c]	Water	TOC	Weekly	3	156
		BOD	Weekly	3	156
		COD	Weekly	3	156
		TDS	Weekly	3	156
		TSS	Weekly	3	156
		TPH	Weekly	3	156
		PAHs	Weekly	1	52
		PCP	Weekly	1	52
		Metals[b]	Monthly	3	36
		Dioxins/furans	Semi-annual	3	6
Compliance Monitoring—Groundwater Pump-and-Treat System					
Site Fugitive Emissions/ Air Quality Perimeter Monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Perimeter Groundwater Monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[b]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Treatment Plant Discharge (NPDES surface water)	Water	TPH	Mth composite	1	12
		PAHs	Mth composite	1	12
		PCP	Mth composite	1	12
		Metals[b]	Mth composite	1	12
		Dioxins/furans	Quarterly	1	4
Waste Disposal Characterization	NAPL	TPH	Quarterly	1	4
		SVOCs[e]	Quarterly	1	4
		Metals[b]	Quarterly	1	4
	Solids (wells)	TCLP[f]	Quarterly	1	4

Table 3-2 (Continued)
Groundwater Pump-and-Treat Performance and Compliance Monitoring

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total Per Event
	Solids (spent GAC)	TCLP[f]	Quarterly	1	4
	Solids (biosolids & sludges)	TCLP[f]	Quarterly	1	4
	Solids (spent filter media)	TCLP[f]	Quarterly	1	4
Confirmational Sampling—Groundwater Pump-and-Treat System					
Soil Borings	Soil	LIF survey	Post-treatment	4 weeks	4 weeks
		NAPL mobility leach test[h]	Post-treatment	10	10
		TPH	Post-treatment	40	200[d]
		PAHs	Post-treatment	40	200[d]
		PCP	Post-treatment	40	200[d]
Long-term Monitoring—Groundwater Pump-and-Treat System (50 to 100 Years)					
Groundwater Monitoring (perimeter and treatment Zones)	Water	PAHs	Annually	25	25
		PCP		25	25

[a]Includes baseline sampling and analysis during system (e.g., wells) installation.
[b]Metals include arsenic, chromium, copper, and zinc.
[c]Field and laboratory analyses are indicated; field analyses assumed to be BOD, COD, TDS, and TSS.
[d]Assumes 3 samples (performance - well construction) or 5 samples (confirmational) from each boring ("sampling point").
[e]SVOCs include PAHs and PCP; low-detection limit analyses required.
[f]Leachate from TCLP analyzed for arsenic, chromium, and SVOCs.
[g]Total number of samples does not include quality assurance/quality control (10 percent per batch of samples).
[h]NAPL mobility leach test: Product leachate test; methodology to be determined.

Notes:
Performance monitoring: Monitor system performance during pump-and-treat remediation; includes baseline and treatment process control.
Compliance monitoring: Monitor compliance with disposal/discharge requirements, including NPDES permit.
Confirmational sampling: To confirm "long-term effectiveness" of the pump-and-treat remediation.

As - arsenic
BOD - biological oxygen demand (5-day)
Cd - cadmium
COD - chemical oxygen demand
Cr - chromium

Table 3-2 (Continued)
Groundwater Pump-and-Treat Performance and Compliance Monitoring

GAC - granular activated carbon
LIF - laser-induced fluorescence
NAPL - nonaqueous-phase liquid
PAHs - polynuclear aromatic hydrocarbons
PCP - pentachlorophenol
PM - particulate matter
SVOCs - semivolatile organic compounds
TCLP - toxicity characteristic leaching procedure
TDS - total dissolved solids
TOC - total organic carbon
TPH - total petroleum hydrocarbons
TSS - total suspended solids

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	AASBG	3 B-asbtswkr + 1 Flatbed Truck			PROD = 100%				CREW HOURS =	1
MIL	XMIXX010 E	Misc. Power Tools	0.50	HR	6.40			0.50	3.20	3.20
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	B-ASBTSWKRF	Asbestos Workers	1.00	HR	62.89	1.00	62.89			62.89
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
	TOTAL					3.00	187.66	3.50	19.73	207.39
	ACARA	1 B-carpnter + Small Tools			PROD = 100%				CREW HOURS =	10
MIL	B-CARPNTERL	Carpenters	1.00	HR	44.71	1.00	44.71			44.71
MIL	B-CARPNTERF	Carpenters	0.25	HR	45.21	0.25	11.30			11.30
MIL	XMIXX020 E	Small Tools	0.31	HR	1.57			0.31	0.49	0.49
	TOTAL					1.25	56.01	0.31	0.49	56.50
	CLACC	3 B-laborer + 1 Hand Compaction Rammer			PROD = 100%				CREW HOURS =	19
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	C10WC003 E	COMPACTOR, RAMMER, 13"X11" SHOE	1.00	HR	2.33			1.00	2.33	2.33
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					3.00	115.67	1.23	2.69	118.36
	CODEA	1 B-eqoprcrn + 1 1 Cy Hydr. Excavator			PROD = 100%				CREW HOURS =	12
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	H25CA004 E	HYD EXCAV,CRWLR, 1.00CY BKT,LON	1.00	HR	42.66			1.00	42.66	42.66
MIL	XMIXX020 E	Small Tools	0.11	HR	1.57			0.11	0.17	0.17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	97.06	1.11	42.83	139.89
	CODEF	2 B-laborer + 2 Loadr-Bckhoe/Compctr			PROD = 100%				CREW HOURS =	2
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDL	Equip. Operators, Medium	2.00	HR	56.51	2.00	113.01			113.01
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	L55KN004 E	HYDRA-PAK TAMPER, 21"W,30"L,27"	1.00	HR	1.93			1.00	1.93	1.93
MIL	XMIXX020 E	Small Tools	0.17	HR	1.57			0.17	0.27	0.27
	TOTAL					4.25	199.51	3.17	38.17	237.68
	CODLB	1 B-eqoprmed + 1 1.5 Cy Front End Ldr, Cwlr			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50	HR	38.39	0.50	19.19			19.19
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
	TOTAL					1.50	76.20	1.00	32.06	108.26

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	CODTC	1 B-eqoprmed + 1 Dozer, Cat D-4H, 90 Hp			PROD = 100%				CREW HOURS =	160
MIL	B-EQOPRMEDF	Equip. Operators, Medium	0.25	HR	57.01	0.25	14.25			14.25
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	T10CA004 E	BLADE, ANGLE, HYDR (FOR D4	1.00	HR	3.64			1.00	3.64	3.64
MIL	T15CA004 E	DOZER,CWLR, D-4H,PS (ADD BLADE	1.00	HR	21.43			1.00	21.43	21.43
	TOTAL					1.25	70.76	2.00	25.07	95.82
	COETF	2 B-laborer + 1 8 Cy Dump Truck,Bckhoe/Loadr			PROD = 100%				CREW HOURS =	6
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.37	HR	1.57			0.37	0.58	0.58
MIL	T40XX008 E	REAR DUMP BODY, 8 CY,(30,000 GV	1.00	HR	2.75			1.00	2.75	2.75
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
	TOTAL					4.00	177.65	3.37	54.97	232.62
	COFGA	1 B-eqoprmed + 1 Grader 12-G			PROD = 100%				CREW HOURS =	19
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
	TOTAL					2.00	95.40	1.00	33.04	128.44
	COKBD	2 B-laborer + 1 Bitum.Dist.Truck/Sweepr			PROD = 100%				CREW HOURS =	2
MIL	A25RS007 E	ASPH DISTR, 3000 GAL, (ADD TR	1.00	HR	15.33			1.00	15.33	15.33
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-TRKDVRLTL	Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	B15MB004 E	STR SWEEPER, 7'W/SPRINKER, TOWE	1.00	HR	4.05			1.00	4.05	4.05
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
	TOTAL					4.00	163.13	4.00	67.28	230.41
	COMCE	Dozer D6 + Dozer D8 + Ripper + Truck			PROD = 100%				CREW HOURS =	30
MIL	B20VE001 E	BRUSH CHIPPER, 6" DIA. LOG, TRL	2.00	HR	15.44			2.00	30.89	30.89
MIL	L10BS002 E	MULTIAPPLIC RAKE FOR D8L TRACTO	2.00	HR	4.98			2.00	9.96	9.96
MIL	R10CA011 E	RIPPER,SING-SHNK BEAM, HYD, D-8	1.00	HR	8.33			1.00	8.33	8.33
MIL	R10CA013 E	RIPPER, SHANKS EA, D-8	1.00	HR	0.72			1.00	0.72	0.72
MIL	T10CA010 E	BLADE, ANGLE, HYDR, FOR D6	1.00	HR	4.32			1.00	4.32	4.32
MIL	T10CA011 E	WINCH,(W/O CABLE),FOR D6 TRACTO	1.00	HR	5.55			1.00	5.55	5.55
MIL	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA008 E	DOZER,CWLR,D-6D,PS,(ADD BLADE)	1.00	HR	35.45			1.00	35.45	35.45
MIL	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T50FO004 E	TRK,HWY,4X4,F250,3/4T,8800 GVW	1.00	HR	8.70			1.00	8.70	8.70
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	B-EQOPRLT L	Eq Oper, Light	2.00	HR	54.50	2.00	108.99			108.99
MIL	B-EQOPRMEDL	Eq Oper, Medium	2.00	HR	56.51	2.00	113.01			113.01

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	38.39	4.00	153.56			153.56
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
	TOTAL					9.00	414.45	14.00	202.98	617.43
	EELEB	2 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	124
MIL	B-ELECTRN F	Electricians	0.50	HR	36.43	0.50	18.21			18.21
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					2.50	90.07	0.23	0.36	90.43
	EELEF	4 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	62
MIL	B-ELECTRN F	Electricians	0.66	HR	36.43	0.66	24.04			24.04
MIL	B-ELECTRN A	Electricians	2.00	HR	29.72	2.00	59.44			59.44
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.45	HR	1.57			0.45	0.71	0.71
	TOTAL					4.66	155.34	0.45	0.71	156.04
	MPLUA	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	83
MIL	B-PLUMBER F	Plumbers	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	XMIXX020 E	Small Tools	0.34	HR	1.57			0.34	0.53	0.53
	TOTAL					1.25	63.49	0.34	0.53	64.02
	MPLUC	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	22
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.10	HR	51.19	0.10	5.12			5.12
MIL	XMIXX020 E	Small Tools	0.19	HR	1.57			0.19	0.30	0.30
	TOTAL					1.10	55.81	0.19	0.30	56.11
	MPLUE	1 B-plumber/laborer + Small Tools			PROD = 100%				CREW HOURS =	388
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.67	HR	1.57			0.67	1.05	1.05
	TOTAL					2.50	114.67	0.67	1.05	115.72
	MPLUJ	2 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	320
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
	TOTAL					3.50	157.12	1.01	1.59	158.70

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MSPFA	1 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	102
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	XMIXX020 E	Small Tools	0.36	HR	1.57			0.36	0.57	0.57
	TOTAL					1.25	63.49	0.36	0.57	64.05
	MSPFB	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	145
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFE	2 B-stm/pipe + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	419
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					2.50	118.73	1.72	2.78	121.50
	ULABB	2 B-laborer + Small Tools			PROD = 100%				CREW HOURS =	137
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50	HR	38.89	0.50	19.44			19.44
MIL	XMIXX020 E	Small Tools	0.27	HR	1.57			0.27	0.42	0.42
	TOTAL					2.50	96.22	0.27	0.42	96.65
	ULABE	1 B-laborer + Misc. Power Tools			PROD = 100%				CREW HOURS =	7
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	XMIXX010 E	Misc. Power Tools	0.22	HR	6.40			0.22	1.41	1.41
MIL	XMIXX020 E	Small Tools	0.09	HR	1.57			0.09	0.14	0.14
	TOTAL					1.25	48.11	0.31	1.55	49.66
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS =	10
MIL	A30BG003 E	ASPH FINISHER, 10'W/SCREED,PNEU	1.00	HR	57.79			1.00	57.79	57.79
MIL	B15MB002 E	STR SWEEPER, 7'W/SPRINKER	1.00	HR	1.64			1.00	1.64	1.64
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	R30IG008 E	ROLLER,STATIC,3WHL,S/P, 12T,84"	2.00	HR	16.60			2.00	33.20	33.20
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	7.00	HR	38.39	7.00	268.73			268.73
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	3.00	HR	56.51	3.00	169.52			169.52
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-TRKDVRHVL	Outside Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
	TOTAL					12.00	539.12	10.00	140.56	679.68
	XLABB	2 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	3
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					2.34	90.00	1.00	1.57	91.57
	XLABC	3 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	8
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					3.34	128.39	1.00	1.57	129.96
	XSABA	3 X-eqoprmed + 1 Grader, 2 Rollers, 3 Trucks			PROD = 100%				CREW HOURS =	6
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	2.00	HR	42.48	2.00	84.96			84.96
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	T60KI002 E	TRK,WTR,OF-HY, 6000GAL,W/CAT621	1.00	HR	61.65			1.00	61.65	61.65
MIL	A10ET001 E	CHIPSPREADER,S/P, 10'W, MECH	1.00	HR	18.31			1.00	18.31	18.31
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T10CA016 E	BLADE, STRAIGHT, HYDR (FOR D8	1.00	HR	7.45			1.00	7.45	7.45
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
	TOTAL					8.00	370.15	6.00	240.47	610.62
	XSGRA	3 X-eqoprmed + 1 Shpf Roller,Grader,Water Truck			PROD = 100%				CREW HOURS =	5
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRK	1.00	HR	3.40			1.00	3.40	3.40
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
	TOTAL					6.00	289.28	6.00	88.82	378.09
	XXPLX	1 B-eqoprlt + Truck + Trailer			PROD = 100%				CREW HOURS =	32
MIL	T40XX012 E	TRUCK OPT,FLATBED, 8' x 9.0'	1.00	HR	0.53			1.00	0.53	0.53
MIL	T50GM012 E	TRK, HWY, 2 AXLE, 24000 GVW, 4X	1.00	HR	12.02			1.00	12.02	12.02
MIL	XMIXX010 E	Misc. Power Tools	1.00	HR	6.40			1.00	6.40	6.40
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	B-EQOPRLT L	Eq Oper, Light	1.00	HR	54.50	1.00	54.50			54.50

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	92.89	4.00	20.52	113.41

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	A-1E/S III	Engineer/Scientist III	23.00	0.00	61.00	0.00	0.00	37.03	HR	06/05/01	0.00	2400
USR	A-1E/S IV	Engineer/Scientist IV	27.00	0.00	61.00	0.00	0.00	43.47	HR	06/05/01	0.00	4943
USR	A-1S/C IV	Secretary/Clerical IV	17.50	0.00	61.00	0.00	0.00	28.18	HR	06/05/01	0.00	2000
USR	A-1SE/SII	Senior Engineer/Scientist II	33.00	0.00	61.00	0.00	0.00	53.13	HR	06/05/01	0.00	5260
USR	A-1T- IV	Technician IV	15.00	0.00	61.00	0.00	0.00	24.15	HR	06/05/01	0.00	20
USR	A2-E/SII	Engineer/Scientist II	19.00	0.00	120.00	0.00	0.00	41.80	HR	06/05/01	0.00	1600
USR	A2-E/SIII	Engineer/Scientist III	23.00	0.00	120.00	0.00	0.00	50.60	HR	06/05/01	0.00	80
USR	A2-E/SIV	Engineer/Scientist IV	27.00	0.00	120.00	0.00	0.00	59.40	HR	06/05/01	0.00	5505
USR	A2-PE/SI	Prin. Engineer/Scientist I	41.50	0.00	120.00	0.00	0.00	91.30	HR	06/05/01	0.00	3480
USR	A2-PE/SIII	Prin. Engineer/Scientist III	47.00	0.00	120.00	0.00	0.00	103.40	HR	06/05/01	0.00	1935
USR	A2-S/CIV	Secretary/Clerical IV	17.50	0.00	120.00	0.00	0.00	38.50	HR	06/05/01	0.00	833
USR	A2-SE/SI	Senior Engineer/Scientist I	30.50	0.00	120.00	0.00	0.00	67.10	HR	06/05/01	0.00	936
USR	A2-SE/SII	Senior Engineer/Scientist II	33.00	0.00	120.00	0.00	0.00	72.60	HR	06/05/01	0.00	3544
USR	A2-SE/SIII	Senior Engineer/Scientist III	36.00	0.00	120.00	0.00	0.00	79.20	HR	06/05/01	0.00	300
USR	A2-SE/SIV	Senior Engineer/Scientist IV	38.50	0.00	120.00	0.00	0.00	84.70	HR	06/05/01	0.00	1702
USR	A2-T/AIV	Technician IV	15.00	0.00	120.00	0.00	0.00	33.00	HR	06/05/01	0.00	896
USR	A2-T/AVI	Technician VI	22.00	0.00	120.00	0.00	0.00	48.40	HR	06/05/01	0.00	904
MIL	B-ASBTSWKR	Asbestos Workers	38.50	0.00	41.40	7.93	0.00	62.39	HR	06/05/01	25.09	3
MIL	B-CARPNTER	Carpenters	23.45	0.00	41.40	11.54	0.00	44.71	HR	06/05/01	22.87	13
MIL	B-ELECTRN	Electricians	21.95	0.00	41.50	4.88	0.00	35.93	HR	06/05/01	27.92	679
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	32.23	0.00	41.40	13.08	0.00	58.67	HR	06/05/01	23.41	12
MIL	B-EQOPRLT	Equip. Operators, Light	29.28	0.00	41.50	13.08	0.00	54.50	HR	06/05/01	15.97	92
MIL	B-EQOPRMED	Equip. Operators, Medium	30.70	0.00	41.50	13.08	0.00	56.51	HR	06/05/01	15.97	1100
MIL	B-LABORER	Laborers, (Semi-Skilled)	21.64	0.00	41.50	7.78	0.00	38.39	HR	06/05/01	12.50	4558
MIL	B-MILLWRT	Millwrights	24.64	0.00	41.50	13.02	0.00	47.87	HR	06/05/01	20.18	400
MIL	B-PLUMBER	Plumbers	29.14	0.00	41.40	9.47	0.00	50.69	HR	06/05/01	22.98	1510
MIL	B-STM/PIPE	Steam / Pipefitters	29.14	0.00	41.40	9.47	0.00	50.69	HR	06/05/01	27.95	1538
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.67	0.00	41.40	11.80	0.00	43.87	HR	06/05/01	11.56	9
MIL	B-TRKDVRLT	Truck Drivers, Light	21.69	0.00	41.40	11.80	0.00	42.48	HR	06/05/01	9.51	2
MIL	X-EQOPRMED	Outside Equip. Operators, Medium	30.70	0.00	41.50	13.08	0.00	56.51	HR	06/05/01	21.21	74
MIL	X-LABORER	Outside Laborers, (Semi-Skilled)	21.64	0.00	41.50	7.78	0.00	38.39	HR	06/05/01	9.72	4873
MIL	X-TRKDVRHV	Outside Truck Drivers, Heavy	22.67	0.00	41.40	11.80	0.00	43.87	HR	06/05/01	19.23	10
MIL	X-TRKDVRLT	Outside Truck Drivers, Light	21.69	0.00	41.40	11.80	0.00	42.48	HR	06/05/01	17.09	17

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE **	TOTAL ** HOURS
UPB	A10ET001	CHIPSPREADER,S/P, 10'W, MECH	5.67	1.96	3.75	0.93	0.26	0.04	5.70	18.31 HR	6
UPB	A25RS007	ASPH DISTR, 3000 GAL	3.98	1.10	4.32	1.42			4.51	15.33 HR	2
UPB	A30BG003	ASPH FINISHER, 10'W/SCREED,PNEUM	18.65	6.46	4.91	1.42	1.16	0.18	25.01	57.79 HR	10
UPB	B15MB002	STR SWEEPER, 7'W/SPRINKER	0.64	0.18		0.14			0.69	1.64 HR	10
UPB	B15MB004	STR SWEEPER, 7'W/SPRINKER, TOWED	0.86	0.25	1.56	0.38	0.05	0.01	0.94	4.05 HR	2
MIL	B20VE001	B-CHIPPER, 6" DIA LOG, TRLR-MTD	1.61	0.45	8.56	2.82	0.04	0.01	1.96	15.44 HR	60
MIL	C10WC003	COMPACTOR, RAMMER, 11"X13" SHOE	0.62	0.11	0.48	0.12			1.00	2.33 HR	19
UPB	F10CA024	FORK LIFT,R/T 8,000#,16.00'L-HT	3.62	1.31	2.15	0.53	0.52	0.08	3.72	11.94 HR	800
MIL	G100N003	GENERATOR, 5.0 KW, 120/240V,PORT	0.42	0.11	0.86	0.21			0.31	1.92 HR	800
UPB	G15CA003	GRADER,MOTOR, ARTIC, CAT 12-G	10.86	4.86	3.92	1.37	0.55	0.09	11.39	33.04 HR	29
MIL	H25CA004	HYD EXCAV,CRWLR, 1.00CY BKT,LONG	15.83	4.80	3.63	1.42			16.98	42.66 HR	12
MIL	L10BS002	MULTI-APPLICATION RAKE, 12.5W 9T	1.82	0.50		0.30			2.35	4.98 HR	60
UPB	L35CA004	LDR,FE, CRWLR, 1.50 CY	8.68	2.93	2.75	1.07			16.64	32.06 HR	17
MIL	L40CA001	LDR,FE, WH, 1.25 CY, ARTIC, 910E	5.79	2.23	2.06	0.89	0.83	0.13	6.01	17.93 HR	350
UPB	L50CA003	LDR,BH,WH, 1.38CY FE BKT, 30"DIP	5.53	2.11	2.44	0.80	0.48	0.07	6.55	17.99 HR	10
UPB	L55KN004	HYDRA-PAK TAMPER, 21"W,30"L,27"H	0.65	0.14		0.25			0.88	1.93 HR	2
UPB	R10CA011	RIPPER, 1-SHANK BEAM,HYD, D-8	3.21	0.89		0.10			4.14	8.33 HR	30
UPB	R10CA013	RIPPER, SHANKS EACH, D-8	0.28	0.08					0.36	0.72 HR	30
UPB	R30CA001	ROLLR,STATIC,S/P,13T,84"W,11TIRE	5.11	1.54	2.44	0.60	0.98	0.15	4.75	15.58 HR	15
UPB	T10CA004	BLADE, ANGLE, HYDR, D-4	1.43	0.48		0.08			1.64	3.64 HR	160
UPB	T10CA010	BLADE, ANGLE, HYDR, D-6	1.71	0.58		0.08			1.96	4.32 HR	30
MIL	T10CA011	WINCH, (ADD CABLE), D-6	2.20	0.74		0.08			2.53	5.55 HR	30
UPB	T10CA016	BLADE, STRAIGHT, HYDR, D-8	2.95	0.99		0.12			3.38	7.45 HR	6
UPB	T10CA017	BLADE, UNIVERSAL, HYDR, D-8	3.15	1.06		0.13			3.61	7.95 HR	30
UPB	T15CA004	DOZER,CWLR, D-4H,PS	5.29	1.96	3.26	1.21			9.70	21.43 HR	160
MIL	T15CA008	DOZER,CWLR, D-6D,PS	9.01	3.34	4.80	1.78			16.52	35.45 HR	30
MIL	T15CA015	DOZER,CWLR, D-8L,PS	26.41	8.90	11.50	3.32			37.85	87.97 HR	36
MIL	T30DW001	TRENCHR,CHN, 24"DP,6"W,WLK-BEHND	0.41	0.12	0.78	0.22	0.04	0.01	0.51	2.08 HR	90
UPB	T40XX008	REAR DUMP BODY, 8.0CY	1.20	0.33		0.09			1.13	2.75 HR	6
MIL	T40XX012	FLATBED, 8'x 9.0'	0.25	0.07					0.20	0.53 HR	32
MIL	T40XX016	FLATBED, 8'x 16.0'	0.34	0.09					0.27	0.71 HR	11
UPB	T40XX033	WATER TANK, 3000 GAL	1.63	0.45					1.32	3.40 HR	5
MIL	T50FO002	TRK,HWY, 6,250GVW,4X4, 1/2T-PKUP	1.75	0.49	2.41	0.70	0.22	0.03	1.91	7.52 HR	2400
UPB	T50FO004	TRK,HWY, 8,800GVW,4X4, 3/4T-PKUP	2.03	0.56	2.83	0.82	0.23	0.03	2.21	8.70 HR	30
UPB	T50FO011	TRK,HWY, 24,700 GVW, 4X2, 2 AXLE	2.87	0.97	4.94	1.32	1.03	0.16	2.96	14.25 HR	24
MIL	T50GM012	TRK,HWY, 25,000 GVW, 4X2, 2 AXLE	2.48	0.80	4.42	1.18	0.52	0.08	2.53	12.02 HR	32
MIL	T50KE003	TRK,HWY, 46,000 GVW, 6X4, 3 AXLE	9.42	2.64	9.46	2.73	0.44	0.07	8.89	33.66 HR	14
UPB	T60KI002	TRK,WTR,OF-HY, 6000GAL,W/CAT621E	18.15	7.76	10.45	3.45	4.07	0.63	17.13	61.65 HR	6
UPB	W35XX009	WELDER, 300 AMP, SKID,ELEC DRIVE	0.37	0.09	0.66	0.27			0.26	1.65 HR	419
UPB	XMIXX010	MISC. POWER TOOLS	2.17	0.76	0.60	0.27			2.60	6.40 HR	34
UPB	XMIXX020	SMALL TOOLS	0.50	0.22	0.16	0.07			0.63	1.57 HR	1298

McCORMICK & BAXTER SUPERFUND SITE

6/5/01

ASSUMED MARKUPS ON LABOR FOR ESTIMATE

	FICA	FUTA	SUI	WC	BENEFITS	OH	TOTAL
OFFICE STAFF (MANAGERS, ENGINEERS, CLERICAL)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	**120.00%**
FIELD STAFF (ENGINEERS, MANAGERS, TECHNICIANS)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	**61.00%**
CRAFT LABOR	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	**41.45%**

NOTES:

1 Workmans Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction.
Workmans Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group

2 Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group.
Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.

3 Overhead rates for craft labor are based on RS Means averages for larger construction companies.
Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resourses), training, medical surveillance, and other costs directly associated with craft labor.
Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group.
Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office.
Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).

4 State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

** PROJECT SETTINGS **

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 0.00

DATE OF ESCALATION SCHEDULE : 07/17/01

PROJECT DIRECT COST COLUMNS

Col Type	L	E	M	U	U
Rep Width	10	10	10	10	10
Title	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER

PROJECT INDIRECT COST COLUMNS

Col Type	U	P	B	X	X
Rep Width	10	10	10	0	0
Title	G&A	PROFIT	BOND	<Unused>	<Unused>

PROJECT OWNER COST COLUMNS

Col Type	U	U	X	X	X
Rep Width	10	10	0	0	0
Title	SCP CONT	BID CONT	<Unused>	<Unused>	<Unused>

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	5	.	ACCOUNT	0
Level 2 ID :	2	.	SYSTEM	0
Level 3 ID :	2	.	SUBSYSTM	0
Level 4 ID :	2	.	ASSY CAT	0
Level 5 ID :	2	.	ASSEMBLY	0
Level 6 ID :	2	.	LEVEL 6	0

Owner Cost Level : 2

** PROJECT SETTINGS **

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)
Shadow	X	X	X	X	X

DETAIL REPORT FORMATTING

PAGE OPTIONS
Page Break Levels : 2
Table of Contents Levels : 4

	0	1	2	3	4	5	6	7
ROW OPTIONS								
Print Titles at Levels :		Y	Y	Y	Y	Y	Y	
Print Totals at Levels :		Y	Y	Y	Y	Y	Y	
Print Notes at Levels :	Y	Y	Y	Y	Y	Y	Y	Y
Print Unit Cost Row :	Y							
Print Page Footer :	N							
Show Cost Codes :	Y							
COLUMNS OPTIONS								
Print Crew Id :	N							
Crew Output :	N							
Unit Cost :	Y							
UPB TITLES								
No. of Levels to Print :	0							
Bracket Titles With :	< >							
Include titles Notes :	Y							

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 G&A : G&A; 6%
Column 2 PROFIT : PROFIT; 10%
Column 3 BOND : BOND; 0.5%
Column 4 <Unused> :
Column 5 <Unused> :

Column 1 SCP CONT : Scope Contingency
Column 2 BID CONT : Bid Contingency
Column 3 <Unused> : Other Government Costs
Column 4 <Unused> :
Column 5 <Unused> :

STANDARD COLUMN WIDTHS

Quantity Columns : 8
Total cost Columns : 12
Unit Cost Columns : 14

SUMMARY FEATURES

Round Totals Column : N-None
Contingency Notes : No
Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)
Show Markup at Level : 2
Display Indirect/Owner Markup as : B - Percent of Total
CSI Sort at Level : (None)

** PROJECT SETTINGS **

REPORT SELECTION

Project Settings : Y Profit Guidelines : N
Contractor Settings : Y
Link Listing : N Measurement Units : U.S.

	REPORT FORMAT TYPE			FOR LEVEL (S)						
	Direct	Indirect	Owner	0	1	2	3	4	5	6
Detail :	Y									
Project :	N	Y	Y		Y	Y	Y	N	N	N
Contractor :	Y	Y		Y	N	N	N	N	N	N
Division :	N	N	N	N	N	N	N	N	N	N
System :	N	N	N	N	N	N	N	N	N	N
2nd View :	N									
Crew :	Y			Y	N	N	N	N	N	N
Labor :	Y									
Equipment :	Y									
Prime Labor Cost Level :	N									

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3300.05 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3300.05.01 FIELD SUPERVISION & MANAGEMENT							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3300.10 SUBMITTALS/IMPLEMENTATION PLANS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3300.12 ENGINEERING							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.15 MOBE, SITE WORK, TEMP FACILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	5.00				
3300.20 TREATMENT SYSTEM CONSTRUCTION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.25 START UP, TESTING, O&M PLAN							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3300.30 DEMOBILIZATION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400. 5 GENERAL CONDITIONS							
	Scope Contingency	P	5.00				
	Bid Contingency	P	10.00				
3400.10 SITE FACILITIES/SECURITY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.15 HEALTH & SAFETY							
	Scope Contingency	P	5.00				
	Bid Contingency	P	5.00				
3400.20 MATERIALS & SUPPLIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.25 MAINTENANCE							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
3400.30 UTILITIES							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.35 SITE O&M LABOR & MISC EQUIPMENT							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.40 CHEMICALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.45 DISPOSALS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.50 SAMPLING & ANALYSIS							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				
3400.55 QC & ANALYTICAL DATA VALIDATION							
	Scope Contingency	P	10.00				
	Bid Contingency	P	10.00				

** CONTRACTOR SETTINGS **

	AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor										
G&A; 6%	6.00									
PROFIT; 10%	10.00									
BOND; 0.5%	0.50									
PL Mechanical Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
PV Paving Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
EL Electrical Contractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									

No errors detected...

* * * END OF ERROR REPORT * * *

* BASIS FOR GROUNDWATER PUMP & TREAT EVALUATION OF CAPITAL/O&M COST *

EPA WORK ASSIGNMENT NUMBER: 59-27-9LIE
EPA CONTRACT NUMBER: 68-W9-0059

SOILS AND GROUNDWATER FEASIBILITY STUDY REPORT

MCCORMICK AND BAXTER
Stockton, California

JULY 1998

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX
75 HAWTHORNE STREET
SAN FRANCISCO, CALIFORNIA 94105

Prepared by:

ICF KAISER ENGINEERS, INCORPORATED
2101 WEBSTER STREET
OAKLAND, CALIFORNIA 94612

and

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX
75 HAWTHORNE STREET
SAN FRANCISCO, CALIFORNIA 94105

REMEDIAL ACTION OBJECTIVES

The overall goal of the remedial action at the M&B site is to protect human health and the environment from the risks presented by contaminated soil, groundwater and sediment. Based on the current zoning designation of the McCormick & Baxter property and nearby land for industrial use and on other factors, EPA has determined that cleanup standards that are protective for continued industrial use of the M&B site are appropriate. This report presents the RAOs and preliminary cleanup standards for surface and subsurface soil and groundwater contamination related to the M&B site; preliminary cleanup standards addressing sediment and surface water contamination are presented in a separate FS report (PNNL, 1998).

The remedial action objectives of soil and groundwater contamination related to the M&B site are to:

- Prevent human exposure to contaminated surface soils via direct contact, ingestion or inhalation;
- Prevent stormwater runoff of contaminated surface soils into adjacent surface water bodies;
- Prevent or minimize the migration of contaminants from subsurface soils and from Old Mormon Slough sediment to groundwater;
- Remove NAPL to the extent practicable to reduce the continuing source of groundwater contamination;
- Contain NAPL sources that cannot be removed;
- Prevent human exposure to groundwater contaminated above cleanup standards;
- Return the affected groundwater aquifer to its designated beneficial uses (aquifer restoration) to the extent practicable within a reasonable timeframe;
- Prevent the further spread of the dissolved groundwater plume if aquifer restoration by attainment of selected cleanup standards is not practicable.

4.3 SUMMARY OF SOIL REMEDIAL ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

The following soil remedial alternatives are retained for detailed analysis based on the results of the effectiveness, implementability and cost evaluation:

- S-1 - No action
- S-3 - Capping-in-Place
- S-4 - Excavation of Subarea X Soils, Consolidation and Capping in Subarea Y
- S-5 - Excavation of Subarea X Soils and Off-site Disposal, Capping of Subarea Y Soils
- S-6 - Excavation and excavation and Ex-situ Solidification/Stabilization of Subarea X and Y soils, Backfilling and Capping in Subarea Y

4.4 DEVELOPMENT AND EVALUATION OF GROUNDWATER AND NAPL TREATMENT TRAINS

In this subsection, groundwater and NAPL treatment technologies and process options that were retained from Section 3.0 are formulated into treatment trains to treat extracted groundwater in order to meet the anticipated discharge criteria. Because all of the groundwater/NAPL alternatives involving extraction have common treatment elements, the treatment trains are evaluated separately before the screening of the alternatives. They are evaluated in this subsection prior to overall evaluation of the alternatives based on their effectiveness, implementability and cost, and the preferred treatment train is included in the detailed analysis of remedial alternatives. This approach is taken to reduce the number of the alternatives and to simplify the screening process.

The EPA *Presumptive Response Strategy for Contaminated Groundwater* identifies presumptive groundwater technologies that should generally be retained for further consideration in the detailed analysis of groundwater alternatives. According to the guidance, the document and its associated Administrative Record will generally constitute the Development and Screening of Alternatives portion of the FS for the ex-situ treatment component of a groundwater remedy. The presumptive technologies are meant to streamline the FS for this component of a groundwater remedy in the same way that other "presumptive remedies" streamline the FS for their respective site types. The presumptive groundwater treatment technologies for dissolved

organic and inorganic contaminants that are applicable to the M&B site were identified in Section 3.0 and are further evaluated here.

Options for the disposal of extracted groundwater are reinjection, discharge and re-use. As discussed in Section 3.0, reinjection is not technically feasible at the M&B site. The City of Stockton has indicated that it cannot accept the anticipated volume of treated groundwater from the M&B site into the Stockton Regional Wastewater Control Facility. Thus, either on-site or off-site discharges to nearby surface waters under a Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit (or substantive NPDES requirements) are the most likely disposal options, in combination with possible reuse for irrigation or industrial purposes in the vicinity of the site.

Of the potential discharge options, it is anticipated that point source discharges to nearby surface water, including Old Mormon Slough, that is classified as "a surface water of the United States," will be required to meet the most stringent treatment standards. The Central Valley Regional Water Quality Control Board (RWQCB) is the delegated authority in California to implement the federal Clean Water Act NPDES program. This includes the implementation of the federal "anti-degradation" policy embodied in State Board Resolution 68-16, which requires that existing high surface water quality be maintained, and federal and state law requirements pertaining to water quality objectives to protect the beneficial uses of surface waters from degradation. The beneficial uses of the San Joaquin River and its tributaries, including Old Mormon Slough, include municipal and domestic supply. Based on these criteria, the RWQCB sets effluent discharge limits based on the best practicable treatment or control technologies to ensure the maintenance of high quality waters. These will be identified as numerical chemical-specific treatment standards for PAHs, PCP and dioxins in the Record of Decision (ROD) for the M&B site.

Inorganic COCs detected in groundwater, namely arsenic and zinc, are not expected to exceed their respective background levels in the extracted groundwater; therefore, metals treatment is not expected to be necessary. Based on available groundwater chemistry data, the extraction scenarios under consideration do not require different treatment units. Thus, under all of the extraction scenarios, NAPL removal and treatment of organics are the two unit operations that have been identified.

Two treatment trains have been formulated to meet the discharge standards anticipated for PCP, PAHs and dioxins:

- Equalization, DNAPL removal by oil-water separator, bag (~ 50 micron) filtration followed by GAC adsorption

- Equalization, DNAPL removal by oil-water separator, biological treatment by a fixed film bioreactor, bag (~ 50 micron) filtration, polishing by GAC adsorption

These treatment trains are illustrated in Figure 4-9.

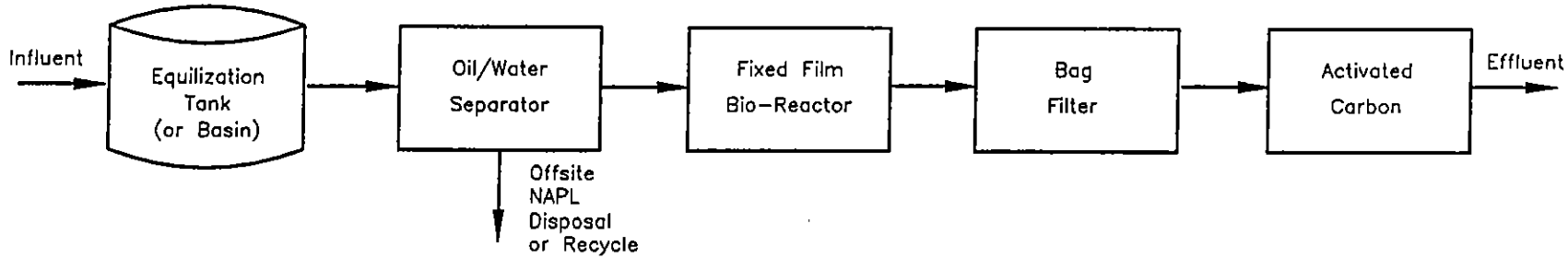
Based on available data, the presence of LNAPL is believed to be localized at the site. LNAPL has been observed at Well A-8, at a thickness of 0.4 ft. LNAPL will be removed from well A-8 by a skimmer, and disposed of in a 55-gallon drum, intermittently, as it is collected. It will be disposed off-site.

Both treatment train options would effectively remove the target COCs. DNAPL will be recovered to the extent practicable in groundwater extraction wells using total fluids pumps with bottom inlets. Potential locations for dedicated DNAPL wells are at and downgradient of the oily waste pond area and the central processing area.

DNAPL will be removed from the groundwater stream by an oil-water separator, typically a coalescing parallel plate unit. Treatability studies have indicated that dioxins are mostly associated with suspended solids that can be removed by filtration. The bag filtration step is, therefore, expected to remove some of the dioxins, and also serve as a pretreatment to carbon adsorption to prevent premature pressure build-up in the carbon beds due to suspended solids. Carbon adsorption effectively removes PAHs, PCP and also dioxins.

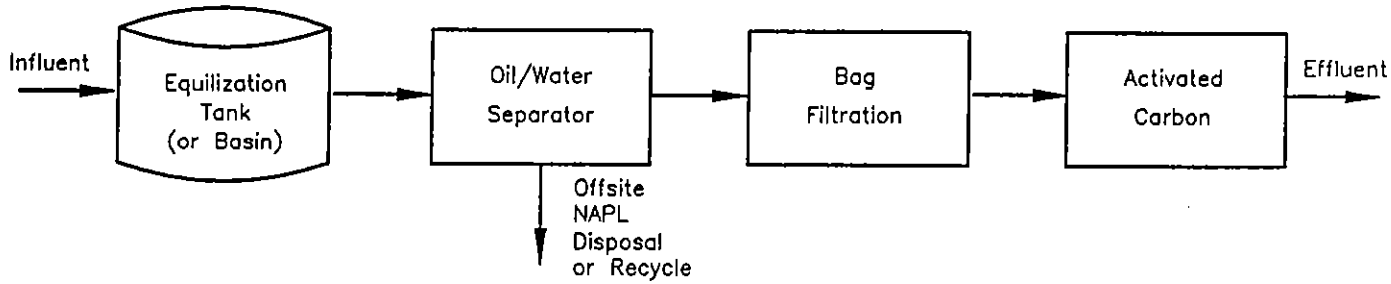
The second treatment train includes a bioreactor that would biologically destruct shorter carbon chain and simple ring structured molecules, mostly the NCPAHs and PCP. Biotreatment would not be effective for molecules with complex ring structures such as the CPAHs and dioxin. Biotreatment upstream of the carbon beds would reduce organic loading on the beds as well as reduce carbon usage. Bag filtration after the bioreactor will remove the suspended solids (including biomass) that may be present in the bioreactor effluent, and will also reduce dioxin concentrations as described above. Carbon adsorption will remove the more difficult organics.

Both treatment trains are implementable. The train that includes the bioreactor, however, would need close monitoring to ensure continued microbial growth and effectiveness.



Bio-Treatment Followed by Activated Carbon Adsorption

* BASIS OF ESTIMATE *



Activated Carbon Treatment

Date: 06/2 /97	Drawn by: E. Chan	ICF TECHNOLOGY	McCormick and Baxter Stockton, California	Figure 4-9	Schematic of Groundwater Treatment Trains
Dwg: FIG4	PM: K. Phalen				

Based on the usage rate observed in the treatability studies, the carbon usage rate for direct carbon adsorption was assessed as 1.19 lbs per 1000 gallons of water treated. PCP was found to be the limiting compound in the adsorption studies. If PCP is treated by other means, such as biotreatment, then the carbon use for other COCs such as BAP was estimated as 0.37 lbs per 1000 gallons of water treated. Based on these data, biotreatment followed by carbon adsorption is assessed to have lower overall 30-year treatment costs than direct carbon adsorption. Consequently, the second treatment train that includes biotreatment followed by carbon adsorption is incorporated into the groundwater remedial alternatives. Design-phase treatability studies and pilot testing, however, are needed for biotreatment of groundwater to assess its effectiveness on the COCs, pretreatment needs, and to establish the design parameters for the proposed system.

4.5 DESCRIPTION AND SCREENING OF GROUNDWATER/NAPL REMEDIAL ACTION ALTERNATIVES

This section presents a detailed description of the four groundwater/NAPL remedial alternatives and screens them based on their effectiveness, implementability and cost. As stated in Section 4.1, the groundwater/NAPL alternatives include No Action and three containment scenarios.

A continuous flushing model (EPA, 1988) was used to estimate aquifer restoration time for groundwater extraction under different extraction scenarios. CPAH concentrations (as BAP) were used to estimate the volume of aquifer material contaminated with CPAHs above the preliminary groundwater cleanup standard. Details of the calculations and the parameters that were used in the modeling are described in Appendix E.

The results of the time frame calculations using groundwater extraction only at the highest hydraulically feasible rate (700 gpm), and not incorporating any source removal, indicate that it would take more than 9600 years for the A Zone, more than 23,000 years for the B Zone, and more than 45,000 years for the C Zone to reduce BAP concentrations to the preliminary groundwater cleanup standards. As demonstrated in the backup calculations, these estimates are approximate and can range higher or lower by about a factor of two depending on the distribution coefficient for the contaminant with the soil.

In performing the time frame analysis for the case in which hypothetical source removal or source reduction is conducted in conjunction with groundwater extraction, it was assumed that soil contamination at the site could be reduced by 90 percent; this represents a very aggressive and optimistic soil remediation scenario. It is important to note that at a site as complex as the M&B site, with soil contamination extending possibly to 150 feet below the ground surface, and

DNAPL identified or suspected in the A, B, C and D zones, achieving 90 percent efficiency in source reduction is extremely unlikely using current proven technologies. Since groundwater concentration is proportional to the soil concentration it is in equilibrium with, it follows that a 90 percent efficient soil remediation scenario would roughly result in an order of magnitude reduction in the initial groundwater concentrations. Therefore, the continuous flushing model was run with groundwater concentrations an order of magnitude lower than detected to simulate an extremely efficient source removal scenario and also using the highest hydraulically sustainable extraction rates.

The results of the time frame analysis based on 90% source removal results in the following estimates for CPAH concentrations to reach the preliminary groundwater cleanup levels: approximately 850 years for the A Zone; more than 12,000 years for the B Zone; and more than 30,000 years for the C Zone. Although a precise estimate of the number of years will vary based on the assumptions used, it is clear that it would not be possible to restore the aquifer quality to the preliminary aquifer cleanup levels within a reasonable time, even if a very aggressive source removal action were to be implemented.

It is important to note that the continuous flushing model that was used takes into consideration only the dissolved plume and adsorption/desorption mechanism for the dissolved contaminant. This model does not take into consideration the potential effect of DNAPL in the subsurface as a continuing source. At this time, the difficulties and impracticability of restoring aquifers impacted with DNAPL within a reasonable time frame are widely acknowledged by EPA and other researchers and experts in the industry. (EPA, 1993, Cohen and Mercer, NRC, 1994, Pankow and Cherry, 1996). Pankow and Cherry (1996) state that in remediating a DNAPL source zone, the aim must be for efficiencies greater than 99.9 percent contaminant removal, if the objective is to approach the restoration levels needed to allow the use of an aquifer as a drinking water supply. These levels of source reduction are not feasible at the M&B site using current proven technologies.

Total project costs used in the following evaluation are based on a 30-year performance period, consistent with EPA guidance. However, all groundwater remedial alternatives considered would have to be implemented for time periods longer than 30 years, whether containment or aquifer restoration is targeted to meet RAOs.

4.5.1 GW/N-1 - No Action

Under this alternative, no action would be taken to address groundwater and NAPL contamination at the site. This alternative is included in the analysis as a baseline response

groundwater cleanup levels. Human health will be protected through institutional controls. The volume and toxicity of contaminants in extracted groundwater is reduced through treatment. However, since it will take a very long time to reduce the levels of CPAHs in the groundwater, residual risk from groundwater contamination would not be demonstrably reduced within a reasonable time frame. The effectiveness of biotreatment needs to be assessed through pilot testing at the site during the design phase. The short-term effectiveness is moderate for this alternative, since long-term pump-and-treat must be implemented at the site.

Implementability. Moderate. Equipment and services are readily available to implement this alternative. Pilot testing needs to be performed to assess the effectiveness and implementability issues for the bioreactor, and also to determine the design parameters. Biotreatment would require close monitoring for effective treatment by microorganisms. Disposal of treated groundwater by NPDES discharge into nearby surface water would require approval by the California Regional Water Quality Control Board. Reuse as a disposal option depends on user needs, and may not always be available. Extracted NAPL would require transportation off-site for recycling or treatment and disposal at an appropriate facility. The implementation time for this alternative including design, regulatory review, procurement, and construction is estimated at 18 to 20 months. Administrative feasibility for this alternative is high since it is an interim remedial action achieving containment of contaminated groundwater plume.

Cost. Medium. For costing purposes capital costs of the treatment units are assumed to be capable of handling 350 gpm. Operational costs are based on the extraction rate of 235 gpm. The capital cost for this alternative is estimated to be $2.5 million. The annual costs are estimated to be $759,000 for the first 10 years and $670,000 for the subsequent 20 years. It is assumed that the quarterly monitoring is reduced to semiannual monitoring after 10 years of operation. The total project cost is estimated as $13.4 million. * BASIS FOR ESTIMATE *

This alternative is retained for further evaluation.

4.5.4 GW/N-4 - Containment through Hydraulic Control with Systematic NAPL Removal

The objective of this alternative is to contain the groundwater contaminant plume to prevent migration of site COCs in the downgradient direction and to prevent further degradation of the aquifer beneath the site. This alternative also includes systematic removal of NAPL using extraction wells located in the NAPL-impacted areas as currently defined in order to reduce the extent of NAPL sources at the site.

This alternative includes the following components:

- Extraction of groundwater from 16 A Zone; 12 B Zone; 9 C Zone; and 4 D Zone and 2 E Zone wells to contain the contaminant plume
- Systematic DNAPL extraction using dedicated wells and LNAPL removal using a skimmer in Well A-8
- On-site treatment of groundwater through the preferred groundwater treatment train
- Disposal of treated groundwater through a combination of NPDES discharge into surface water and reuse for irrigation or industrial uses
- Off-site recycling or treatment/disposal of extracted NAPL
- Institutional controls including long-term monitoring of groundwater and NAPL

The total groundwater extracted under this alternative is anticipated to be the same as that for GW/N-3, approximately 235 gpm. Under the proposed extraction scenario, lateral capture of the contaminant plume is achieved. In the A Zone, the vertical hydraulic gradient downward towards the B Zone will persist. A neutral vertical gradient is achieved between the B, C and D Zones. Vertical capture of DNAPL would also be achieved. Two E Zone wells would be placed, one at the southern site perimeter and one outside the property boundary near well OFS-4E, to prevent downgradient contaminant migration in the deep zones. Each well is expected to operate at 15 gpm. The extraction regime could be modified by increasing the pumping rates in the proposed wells, should expanded capture be needed in the A, B, C and D zones. The modeling results simulating the extraction regime of this alternative are illustrated in Figure 4-11.

Dedicated DNAPL extraction wells would be installed in areas where significant quantities of DNAPL are anticipated, such as the location of the oily waste ponds and the central processing area. Extracted groundwater would be treated on the M&B site property. The groundwater treatment train and groundwater and NAPL disposal methods would be similar to those described for Alternative GW/N-3. As stated in the previous alternative, the treatment system will be sized with contingency to allow additional flow, should pumping rates in the upper zones need to be increased.

Institutional controls will be implemented similar to those described for Alternative GW/N-3.

Effectiveness. Low to moderate. This alternative meets some of the groundwater RAOs, but does not meet the objective of restoring the aquifer beneath the site to preliminary cleanup levels. As with Alternative GW/N-3, this alternative will not achieve preliminary groundwater cleanup levels, primarily due to the nature and extent of NAPL contamination found at the site. Even though Alternative GW/N-4 targets systematic NAPL removal, this method would only remove mobile DNAPL, not the residual DNAPL that is found throughout the subsurface in a large portion of the site. The aqueous COC plume is captured in all zones, and a neutral gradient is obtained between the deeper zones to prevent further vertically downward migration of DNAPL.

Human health will be protected through institutional controls. The volume and toxicity of contaminants in extracted groundwater will be reduced through treatment; however, as explained under Alternative GW/N-3, residual risk from groundwater contamination would not be demonstrably reduced within a reasonable time frame. The effectiveness of biotreatment needs to be assessed through pilot testing at the site. The short-term effectiveness of this alternative is moderate since long-term pump-and-treat must be implemented at the site.

Implementability. Moderate. Technical implementability issues for this alternative are similar to those for Alternative GW/N-3. The same equipment and services will be required to implement this alternative and similar pilot testing will be performed. As for GW/N-3, the implementation of this alternative including design, regulatory review, procurement, and construction, is estimated at 18 to 20 months. Administrative feasibility for this alternative is high since it is an interim remedial action alternative, achieving plume containment.

Cost. Medium. The capital cost for this alternative is estimated as $2.7 million. The annual O&M and monitoring costs are estimated as $898,000 for the first 10 years, and $810,000 for the subsequent 20 years. The total project costs are estimated as $15.8 million.

This alternative is retained for further analysis.

4.5.5 GW/N-5 - Containment through Hydraulic Control and Vertical Barriers, Systematic NAPL Removal

The objective of this alternative, as with Alternatives GW/N-3 and GW/N-4, is to contain the groundwater contaminant plume and to systematically remove DNAPL using extraction wells located in the NAPL-impacted areas as currently defined. However, this alternative also includes partial physical containment to enhance groundwater and NAPL recovery.

McCormick and Baxter
Feasibility Study-Groundwater Remediation Alternatives Cost

Alternative GW- 4 - Hydraulic Containment/NAPL Removal

* KAISER (1998) ESTIMATE *

Description	Unit	Unit Cost	Quantity	Subtotal	Quantity	Subtotal
Capital Costs						
Install Wells	lf	$ 75	4,085	$ 306,375		
Extraction Pumps	ea	$ 1,000	43	$ 43,000		
Equilization Tank	ea	$ 50,000	1	$ 50,000		
Oil/Water Seperator	ea	$ 400,000	1	$ 400,000		
Bag Filter System	ea	$ 7,406	1	$ 7,406		
Activated Carbon	ea	$ 75,000	1	$ 75,000		
Bioreactor System	ea	$ 525,000	1	$ 525,000		
Vertical Barriers	ea	$ 10	-	$ -		
NAPL Extraction Pumps	ea	$ 2,950	10	$ 29,500		
Compressors	ea	$ 6,450	5	$ 32,250		
Tank Full Shut Offs	ea	$ 1,250	3	$ 3,750		
Piping, electrical, and instrumentation				$ 220,842		
		Capital Cost Subtotal:		$ 1,693,123		
Design	20%			$ 338,625		
CM	12%			$ 203,175		
Contingency	25%			$ 423,281		
		TOTAL CAPITAL COSTS:		$ 2,658,203		
Operation and Maintenance Costs				First 10 years		Last 20 Years
Annual NAPL and GW Monitoring	event	$ 35,500	4	$ 142,000	2	$ 71,000
NPDES Permit Monitoring	event	$ 1,700	4	$ 6,800	4	$ 6,800
NAPL Disposal	gal	$ 6.00	20,000	$ 120,000		$ 120,000
Biotreatment	1000-gal	$ 1.98	118,440	$ 234,156		$ 234,156
Carbon Operating	lb	$ 1.19	39,085	$ 46,511		$ 46,511
235 gpm						
350 day/year						
0.33 lb-carbon/1000-gal						
System Maintenance	10%	of capital costs		$ 169,312		$ 169,312
		Subtotal Annual O&M Cost:		$ 718,780		$ 647,780
Contingency	25%			$ 179,695		$ 161,945
		TOTAL ANNUAL O&M COSTS:		$ 898,474		$ 809,724
		PRESENT WORTH OF O&M:		$ 13,132,754	For 30 Years, 5% Net Discount Rate	
		TOTAL ALTERNATIVE COST:		$ 15,790,957	For 30 Years	

Notes:
1) Unit costs summarized on Table D-1: GW/NAPL Unit Cost.
2) Quantities summarized on Table D-2: Input Quantities.

APPENDIX E

Thermal Treatment Scenario 1—Thermal Treatments by Area

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - THERMAL TREATMENT TECHNOLOGY
MAIN PROCESS AREA (MPA), CELLON PROCESS AREA (CPA), AND NORTH-MPA

SCENARIO 1 - THERMAL TREATMENT BY AREA

CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:
This estimate is based on the schedule in Table 5-1, for the period 2003 - 2038. MPA and CPA are historic sources of NAPL. N-MPA is under the slough. Scenario 1 contains 1.54 million cubic yards of impacted soil (52 percent of estimated volume of impacted soil). This scenario includes thermal treatment by steam and electrical resistance heating; vapor and NAPL/groundwater extraction and treatment; treated water reinjection; and short- and long-term site monitoring for 30 years.

	QTY	UNIT	UNIT COST	TOTAL (INCLUDING OWNER COSTS)	NOTES
3300 CAPITAL COSTS					
3300.05 GENERAL CONDITIONS					
3300.05.01 FIELD SUPERVISION & MANAGEMENT	1	JOB	1,540,060.00	1,540,060	6 months of procurement, 18 months of construction support.
3300.05.02 ADMINISTRATION HOME OFFICE	1	JOB	468,967.00	468,967	Management and cost control.
3300.05.03 PURCHASING	1	JOB	145,143.00	145,143	Procurement of equipment, materials, supplies, subcontractors.
3300.05.06 FIRST AID, FIRE, TRAFFIC & SECURITY	1	JOB	160,127.00	160,127	Includes 24-hour security.
3300.05.07 HEALTH & SAFETY	1	JOB	85,407.00	85,407	Equipment and supplies, site-specific training and medical.
3300.05.09 TEMPORARY CONSTRUCTION FACILITIES	1	JOB	139,225.00	139,225	Contractor's office and storage, utility connections.
3300.05.10 PROJECT UTILITIES	1	JOB	22,150.00	22,150	Service fees for construction period.
3300.05.15 PATENT FEES	1	JOB	117,183.00	117,183	Allocation of $100,000; fee structure has not been determined.
SUBTOTAL GENERAL CONDITIONS	**1**	**JOB**		**2,678,262**	
Scope Contingencies 5%				133,913	Risk associated with incomplete design.
SUBTOTAL				**2,812,175**	
Bid Contingencies 10%				281,218	Risks associated with changed conditions after contract award.
TOTAL GENERAL CONDITIONS INCLUDING CONTINGENCY				**3,093,393**	
3300.10 SUBMITTALS / IMPLEMENTATION PLANS					
3300.10.01 Construction Work Plan	1	EA	14,331.00	14,331	Work activities, sequence, and schedules.
3300.10.02 Contractors Quality Control Management Plan	1	EA	8,556.00	8,556	Quality control responsibility, procedures, and corrective action.
3300.10.03 Contractors Chemical Quality Control Plan	1	EA	16,141.00	16,141	Chemical quality control responsibility, controls, validation
3300.10.05 Regulatory Compliance Plan/Update	1	EA	45,643.00	45,643	Regulatory requirements, reporting, and compliance activities.
3300.10.06 Traffic Routing Plan	1	EA	2,319.00	2,319	Impact to W. Washington Street, internal traffic routing & safety.
3300.10.07 Site Health and Safety Plan	1	EA	13,834.00	13,834	Worker/visitor health and safety requirements, procedures.
3300.10.15 Performance Testing Plan	1	EA	12,566.00	12,566	Boiler source testing, emissions control system requirements.
3300.10.41 Subcontracting Plan	1	EA	2,811.00	2,811	Competitive and non-discriminatory policies and procedures.
3300.10.42 Environmental Protection Plan	1	EA	3,905.00	3,905	Site-specific policies and procedures.
3300.10.43 Correct/Emerg Contingency Action Plan	1	EA	3,591.00	3,591	Emergency response policies and procedures.
SUBTOTAL SUBMITTALS / IMPLEMENTATION PLANS	**1**	**JOB**		**123,697**	
Scope Contingencies 5%				6,185	Risk associated with incomplete design.
SUBTOTAL				**129,882**	
Bid Contingencies 5%				6,494	Risks associated with changed conditions after contract award.
TOTAL SUBMITTALS/IMPLEMENTATION PLANS INCL CONTINGENCY				**136,376**	
3300.12 ENGINEERING					
3300.12.10 Completion Design - Civil	1	JOB	215,804.00	215,804	Building structure, concrete, pipelines, utility extensions.
3300.12.15 Completion Design - Process	1	JOB	504,824.00	504,824	Wastewater treatment system, equipment, plant piping
3300.12.20 Completion Design - Electrical	1	JOB	114,968.00	114,968	Services, controls, lighting, instrumentation, motors.
3300.12.26 PCS Programming	1	JOB	35,937.00	35,937	Process control, programmable logic control, interfaces.
3300.12.32 Completion Design - Mechanical	1	JOB	75,208.00	75,208	Piping, instrumentation, HVAC, plumbing.
3300.12.37 Completion Design - Specialty Subcontractor	1	JOB	937,464.00	937,464	Steam and electrical resistance heating, instrumentation, controls.
SUBTOTAL ENGINEERING	**1**	**JOB**		**1,884,205**	
Scope Contingencies 10%				188,421	Risk associated with incomplete design.
SUBTOTAL				**2,072,626**	
Bid Contingencies 10%				207,263	Risks associated with changed conditions after contract award.
TOTAL ENGINEERING INCLUDING CONTINGENCY				**2,279,888**	

	QTY	UNIT	UNIT COST	TOTAL (INCLUDING OWNER COSTS)	NOTES
3300.15 MOBE, SITE WORK, TEMP FACILITIES					
3300.15.01 CLEAR SITE BRUSH	30	ACR	723.52	21,706	Site preparation for field activities.
3300.15.02 MOBE EQUIP & FACILITIES	1	JOB	1,505.00	1,505	Heavy equipment, personnel to project site.
3300.15.05 TEMPORARY FACILITIES	1	JOB	306,006.00	306,006	Trailers, utilities (water, sewer, electricity, gas, phones), paving.
3300.15.08 SIGNS, BARRICADES	1	JOB	93,223.00	93,223	Traffic, dust, erosion, and site cleaning.
3300.15.10 GRAVEL CAP	10.8	ACR	26,855.62	290,041	10.9 acres, 6-inch thick for site access, fugitive emissions control.
3300.15.15 ASPHALT CAP	4222	SY	26.07	110,068	0.9 acre, 4-inch thick for Celton Process Area emission control.
3300.15.92 SURVEYS	1	JOB	33,983.00	33,983	Layout and construction control surveys.
3300.15.97 MEETINGS	2	EA	6,700.22	13,400	Preconstruction meeting, coordination meetings.
SUBTOTAL MOBE, SITE WORK, TEMP FACILITIES	**1**	**JOB**		**869,931**	
Scope Contingencies 10%				86,993	Risk associated with incomplete design.
SUBTOTAL				**956,924**	
Bid Contingencies 10%				95,692	Risks associated with changed conditions after contract award.
TOTAL MOBE, SITE WORK, TEMP FACILITIES INCL CONTINGENCY				**1,052,617**	
3300.20 TREATMENT SYSTEM CONSTRUCTION					
3300.20.01 TREATMENT PLANT BUILDING	1	JOB	457,399.00	457,399	Temporary (Sprung or Rubb type), 100 ft by 200 ft, concrete slab.
3300.20.05 TREATMENT SYSTEM EQUIP. F&I	1	JOB	4,597,977.71	4,597,978	Expedite fabrication, submittals, purchasing, shipping & install.
3300.20.07 WELL INSTRUMENTS/CONTROLS	1	JOB	2,414,917.76	2,414,918	Cables, vertical electrode arrays, instruments, and power supply.
3300.20.10 INSTALL WELLS	1	JOB	9,467,136.85	9,467,137	Extraction, injection wells, instrumentation, and pumps.
3300.20.15 PIPING	1	JOB	4,513,978.00	4,513,978	Steam, vapor, NAPL/groundwater, air piping, headers and laterals.
SUBTOTAL TREATMENT SYSTEM CONSTRUCTION	**1**	**JOB**		**21,451,409**	
Scope Contingencies 10%				2,145,141	Risk associated with incomplete design.
SUBTOTAL				**23,596,550**	
Bid Contingencies 10%				2,359,655	Risks associated with changed conditions after contract award.
TOTAL TREATMENT SYSTEM CONSTRUCTION INCL CONTINGENCY				**25,956,205**	
3300.25 STARTUP, TESTING, O&M MANUAL					
3300.25.05 O&M MANUAL	1	JOB	50,439.00	50,439	Operation and maintenance procedures and system control.
3300.25.10 STARTUP/COMMISSION TREATMENT SYSTEM	1	JOB	636,641.00	636,641	Startup, equipment shake-down, training and testing.
SUBTOTAL STARTUP, TESTING, O&M MANUAL	1	JOB		**687,080**	
Scope Contingencies 10%				68,708	Risk associated with incomplete design.
SUBTOTAL				**755,788**	
Bid Contingencies 10%				75,579	Risks associated with changed conditions after contract award.
TOTAL STARTUP, TESTING, O&M MANUAL INCL CONTINGENCY				**831,367**	
3300.30 DEMOBILIZATION					
3300.30.21 DEMOBILIZATION (CONSTRUCTION)	1	JOB	16,606.00	16,606	Remove construction equipment and personnel from site.
3300.30.22 REPORTS, CLOSEOUT	1	JOB	170,074.00	170,074	Closeout of chemical testing, health & safety, record drawings.
SUBTOTAL DEMOBILIZATION	**1**	**JOB**		**186,680**	
Scope Contingencies 10%				18,668	Risk associated with incomplete design.
SUBTOTAL				**205,348**	
Bid Contingencies 10%				20,535	Risks associated with changed conditions after contract award.
TOTAL DEMOBILIZATION INCLUDING CONTINGENCY				**225,883**	
TOTAL CAPITAL COSTS	**1**	**JOB**		**27,881,265**	
TOTAL CAPITAL COST, INCLUDING CONTINGENCY				**33,575,728**	

	QTY	UNIT	UNIT COST	TOTAL (INCLUDING OWNER COSTS)	NOTES
3400 1ST YEAR O&M					
3400.05 GENERAL CONDITIONS					
3400.05.05 OFFSITE ADMINISTRATIVE COSTS	12	MO	10,164.14	121,970	
3400.05.10 ERH SYSTEM OP/REPORTING	12	MO	33,829.17	405,950	
3400.05.15 SITE SECURITY	12	MO	12,831.54	153,978	Site security and control, 24 hours per day.
SUBTOTAL GENERAL CONDITIONS				**681,898**	
Scope Contingencies 5%				34,095	
SUBTOTAL				**715,993**	
Bid Contingencies 5%				35,800	
TOTAL GENERAL CONDITIONS INCL CONTINGENCY				**751,793**	
3400.10 SITE FACILITIES	**12**	**MO**	**4,542.79**	**54,513**	
Scope Contingencies 5%				2,726	
SUBTOTAL				**57,239**	
Bid Contingencies 5%				2,862	
TOTAL SITE FACILITIES INCLUDING CONTINGENCY				**60,101**	
3400.15 HEALTH & SAFETY	**12**	**MO**	**925.75**	**11,109**	
Scope Contingencies 5%				555	
SUBTOTAL				**11,664**	
Bid Contingencies 5%				583	
TOTAL HEALTH & SAFETY INCLUDING CONTINGENCY				**12,248**	
3400.20 MATERIALS & SUPPLIES	**12**	**MO**	**351.55**	**4,219**	
Scope Contingencies 10%				422	
SUBTOTAL				**4,640**	
Bid Contingencies 10%				464	
TOTAL MATERIALS & SUPPLIES INCL CONTINGENCY				**5,105**	
3400.25 MAINTENANCE	**12**	**MO**	**7,820.01**	**93,840**	
Scope Contingencies 10%				9,384	
SUBTOTAL				**103,224**	
Bid Contingencies 10%				10,322	
TOTAL MAINTENANCE INCL CONTINGENCY				**113,547**	
3400.30 UTILITIES	**12**	**MO**	**497483.78**	**5,969,805**	
Scope Contingencies 10%				596,981	
SUBTOTAL				**6,566,786**	
Bid Contingencies 10%				656,679	
TOTAL UTILITIES INCLUDING CONTINGENCY				**7,223,464**	
3400.35 SITE O&M LABOR & MISC EQUIPMENT	**12**	**MO**	**94,376.34**	**1,132,516**	
Scope Contingencies 10%				113,252	
SUBTOTAL				**1,245,768**	
Bid Contingencies 10%				124,577	
TOTAL SITE O&M LABOR & MISC EQ INCL CONTINGENCY				**1,370,344**	
3400.40 CHEMICALS	**12**	**MO**	**8,527.02**	**102,324**	
Scope Contingencies 10%				10,232	
SUBTOTAL				**112,557**	
Bid Contingencies 10%				11,256	
TOTAL CHEMICALS INCLUDING OWNER CONTINGENCY				**123,812**	

	QTY	UNIT	UNIT COST	TOTAL (INCLUDING OWNER COSTS)	NOTES
3400.45 DISPOSALS					
3400.45.05 SLUDGE	12	MO	2,831.92	33,983	
3400.45.10 CARBON (GAC, VAPOR PHASE)	12	MO	507.79	6,093	
3400.45.15 CARBON (GAC, LIQUID PHASE)	12	MO	1,493.59	17,923	
3400.45.20 PPE & MISC	12	MO	195.31	2,344	
3400.45.25 OILY WASTE	12	MO	16,572.97	198,876	
3400.45.30 WASTE MISC COSTS	12	MO	1,206.01	14,472	
SUBTOTAL DISPOSALS				**273,691**	
Scope Contingencies 10%				27,369	
SUBTOTAL				**301,060**	
Bid Contingencies 10%				30,106	
TOTAL DISPOSALS INCLUDING CONTINGENCY				**331,166**	
3400.49 SAMPLING & ANALYSIS					
3400.49.05 PERFORMANCE MONITORING	12	MO	1,471.36	17,656	
3400.49.10 COMPLIANCE MONITORING	12	MO	19,056.66	228,680	
SUBTOTAL SAMPLING & ANALYSIS	**12**	**MO**		**246,336**	
Scope Contingencies 10%				24,634	
SUBTOTAL				**270,970**	
Bid Contingencies 5%				13,548	
TOTAL SAMPLING & ANALYSIS INCL CONTINGENCY				**284,518**	
3400.55 QC & ANALYTICAL DATA VALIDATION					
3400.55.05 DATA VALIDATION	12	MO	2,262.22	27,147	
SUBTOTAL QC & ANALYTICAL DATA VALIDATION	**12**	**MO**		**27,147**	
Scope Contingencies 5%				1,357	
SUBTOTAL				**28,504**	
Bid Contingencies 5%				1,425	
TOTAL QC & ANALYTICAL DATA VALIDATION INCL CONTINGENCY				**29,929**	
TOTAL 1ST YEAR O&M	**12**	**MO**		**8,597,399**	
TOTAL 1ST YEAR O&M COST, INCLUDING CONTINGENCY				10,306,028	

TOTAL McCORMICK & BAXTER SUPERFUND SITE SCENARIO 1 - THERMAL TREATMENT BY AREA

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Update O&M Plan	2011	1	EA	1,500.00	1,500	Update Plan
Five Year Review Report	2012	1	EA	5,000.00	5,000	1 report at end of Year 10
Five Year Review Report	2017	1	EA	5,000.00	5,000	1 report at end of Year 15
Five Year Review Report	2022	1	EA	5,000.00	5,000	1 report at end of Year 20
Five Year Review Report	2027	1	EA	5,000.00	5,000	1 report at end of Year 25
Five Year Review Report	2032	1	EA	5,000.00	5,000	1 report at end of Year 25
Remedial Action Report	2038	1	EA	300,000.00	300,000	Final Report
Equipment Repairs/Replacement:						
Replace Well Extract/LoFlo Pumps	2012	124	EA	4,000.00	496,000	Replacement during active treatment.
Replace Well LoFlo Pumps	2017	25	EA	1,000.00	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	2022	25	EA	1,000.00	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	2027	25	EA	1,000.00	25,000	Replacments during monitoring phase.
Replace Well LoFlo Pumps	2032	25	EA	1,000.00	25,000	Replacments during monitoring phase.
Well Repairs/Replacement:						
Replace Monitoring Wells	2023	10	EA	17,000.00	170,000	Assume replace 10 wells every 10 yr.
Replace Monitoring Wells	2033	10	EA	17,000.00	170,000	(Add 20K/event for demo/disposals)
Demolition/Restoration Site	2038	1	JOB	500,000.00	500,000	<Includes removal of monitoring wells

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE (2001)	NOTES
Engineering	2003	1,139,944	0.87344	995,671	
Engineering	2004	1,139,944	0.81630	930,534	
Construction	2005	8,929,563	0.76290	6,812,321	
Construction	2006	13,955,053	0.71299	9,949,760	
Startup & Demobe	2007	8,411,224	0.66634	5,604,754	
O&M STEAM INJECT YEAR 1	2008	10,306,028	0.62275	6,418,076	
O&M STEAM INJECT YEAR 2	2009	9,608,333	0.58201	5,592,137	<Includes demo ERH system
O&M STEAM INJECT YEAR 3	2010	7,521,201	0.54393	4,091,035	
O&M STEAM INJECT YEAR 4	2011	6,756,122	0.50835	3,434,470	
O&M COOL DOWN YEAR 5	2012	2,918,822	0.47509	1,386,711	
O&M COOL DOWN YEAR 6	2013	2,913,906	0.44401	1,293,809	
O&M COOL DOWN YEAR 7	2014	4,855,494	0.41496	2,014,857	<Includes demo GWTP, piping & wells
O&M MONITORING WELLS	2015-2019	641,950	0.31657	203,225	at end of cool down phase.
O&M MONITORING WELLS	2020-2024	641,950	0.22571	144,897	Only monitoring wells remain.
O&M MONITORING WELLS	2025-2029	641,950	0.16093	103,309	
O&M MONITORING WELLS	2030-2034	641,950	0.11474	73,658	
O&M MONITORING WELLS	2035-2037	385,170	0.08754	33,716	
Periodic Cost	2011	1,500	0.50835	763	
Periodic Cost	2012	501,000	0.47509	238,021	
Periodic Cost	2017	30,000	0.33873	10,162	
Periodic Cost	2022	30,000	0.24151	7,245	
Periodic Cost	2023	170,000	0.22571	38,371	
Periodic Cost	2027	30,000	0.17220	5,166	
Periodic Cost	2032	30,000	0.12277	3,683	
Periodic Cost	2033	170,000	0.11474	19,506	
Periodic Cost	2038	800,000	0.08181	65,447	Restore Site/Abandon Wells

TOTAL COSTS 30 YEARS	$83,171,104	
TOTAL PRESENT VALUE OF SCENARIO 1		$ 49,471,305

APPENDIX F

Thermal Treatment Scenario 1—Thermal Treatment by Depth Zone

APPENDIX F-1

Cost Estimate Summary—Scenario 1, Thermal Treatment Phased by Depth Zone

COST ESTIMATE SUMMARY

McCORMICK & BAXTER SUPERFUND SITE - THERMAL TREATMENT TECHNOLOGY
MAIN PROCESS AREA (MPA), CELLON PROCESS AREA (CPA), AND NORTH-MPA

SCENARIO 1 - THERMAL TREATMENT PHASED BY DEPTH ZONE

CONTRACT: DACA67-98-D-1005, DO 65

Site: McCormick & Baxter Superfund Site
Location: 1214 W. Washington Street, Stockton, CA
Phase: 10% Conceptual Design
[Order-of-Magnitude Estimate (-30% to +50%)]
Base Year: 2001

Description:
This estimate is based on the schedule in Table 5-2, for the period 2003 - 2037. MPA and CPA are historic sources of NAPL. N-MPA is under the slough. Scenario 1 contains 1.54 million cubic yards of impacted soil (52 percent of estimated volume of impacted soil). This scenario includes thermal treatment phased by depth zone, using steam and electrical resistance heating; vapor and NAPL/groundwater extraction and treatment; treated water reinjection; and short- and long-term site monitoring for 30 years.

YEAR/ACTIVITY (CAPITAL AND O&M)	QTY	UNIT	UNIT COST	TOTALS BY WBS	NOTES
2003 ENGINEERING & DESIGN	1	JOB	1,139,944	1,139,944	Design for full system layout, Step 1 & 2 bid and construction.
2004 ENGINEERING/DESIGN/CONTRACTING	1	JOB	1,139,944	1,139,944	Design for full system layout, Step 1 & 2 bid and construction.
2005 CONSTRUCTION STEP 1	1	JOB	8,621,901	8,621,901	Construct Step 1 wellfield, Step 1 & 2 treatment systems
2006 CONSTRUCTION/STARTUP STEP 1	1	JOB	6,252,918	6,252,918	Construct Step 1 & 2 treatment systems; startup & commission.
2007 HEAT YEAR 1 STEP 1	1	JOB	4,409,334	4,409,334	Steam & ERH treatment of E-zone aquifer; extract from D-zone aquifer.
2008 HEAT YEAR 2 STEP 1	1	JOB	3,525,700	3,525,700	Steam & ERH treatment of E-zone aquifer; extract from D-zone aquifer.
2009 HEAT YEAR 3 STEP 1; CONSTRUCT STEP 2 WELLS	1	JOB	10,946,520	10,946,520	Steam & ERH treatment of E-zone aquifer; extract from D-zone aquifer; construct Step 2 wellfield. Design Step 3 & 4 treatment system.
2010 HEAT YEAR 1 STEP 2	1	JOB	5,335,217	5,335,217	Steam & ERH treatment of E-zone aquifer; extract from D-zone aquifer; construct Step 2 wellfield. Design and bid Step 3 & 4 treatment system. Demobe ERH system.
2011 HEAT YEAR 2 STEP 2; ENGR/CONSTRUCT UPGRADE	1	JOB	6,845,418	6,845,418	Steam treatment of D- and E-zone aquifers; extract from C-, D-, and E-zone aquifers. Construct Step 3 & 4 treatment system and Step 3 wellfield.
2012 HEAT YEAR 3 STEP 2; CONSTRUCT UPGRADE	1	JOB	10,602,784	10,602,784	Steam treatment of D- and E-zone aquifers; extract from C-, D-, and E-zone aquifers. Construct Step 3 & 4 treatment system and wellfield.
2013 HEAT YEAR 1 STEP 3	1	JOB	5,956,434	5,956,434	Steam treatment of C-, D- and E-zone aquifers; extract from A-, B-, C-, D-, and E-zone aquifers.
2014 HEAT YEAR 2 STEP 3	1	JOB	4,932,995	4,932,995	Steam treatment of C-, D- and E-zone aquifers; extract from A-, B-, C-, D-, and E-zone aquifers.
2015 HEAT YEAR 3 STEP 3; WELLS FOR STEP 4	1	JOB	9,527,422	9,527,422	Steam treatment of C-, D- and E-zone aquifers; extract from A-, B-, C-, D-, and E-zone aquifers. Construct Step 4 wellfield.
2016 HEAT YEAR 1 STEP 4	1	JOB	5,510,848	5,510,848	Steam treatment and extraction in the A-, B-, C-, D- and E-zone aquifers.
2017 HEAT YEAR 2 STEP 4	1	JOB	4,641,447	4,641,447	Steam treatment and extraction in the A-, B-, C-, D- and E-zone aquifers.
2018 HEAT YEAR 3 STEP 4	1	JOB	4,641,447	4,641,447	Steam treatment and extraction in the A-, B-, C-, D- and E-zone aquifers.
2019 COOL DOWN YEAR 1	1	JOB	2,589,655	2,589,655	Thermal treatment ends; continue extraction during cool-down period.
2020 COOL DOWN YEAR 2	1	JOB	2,461,629	2,461,629	Continue extraction during cool-down period.
2021 COOL DOWN YEAR 3	1	JOB	2,553,189	2,553,189	Continue extraction during cool-down period.
2022 O&M MON. WELLS & DEMO TREATMENT SYSTEM	1	JOB	1,978,542	1,978,542	NAPL/groundwater and vapor extraction ends; demolition of treatment system.
2023 O&M MONITORING WELLS 1ST YEAR	1	JOB	128,390	128,390	Typical yearly monitoring effort following completion of active treatment.

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Reports:						
Five Year Review Report	5	1	EA	5,000.00	5,000.00	1 report at end of Year 5 (of operation)
Five Year Review Report	10	1	EA	5,000.00	5,000.00	1 report at end of Year 10
Five Year Review Report	15	1	EA	5,000.00	5,000.00	1 report at end of Year 15
Five Year Review Report	20	1	EA	5,000.00	5,000.00	1 report at end of Year 20
Five Year Review Report	25	1	EA	5,000.00	5,000.00	1 report at end of Year 25
Five Year Review Report	30	1	EA	5,000.00	5,000.00	1 report at end of Year 30
Remedial Action Report	35	1	EA	300,000.00	300,000.00	Final Report
Equipment Repairs/Replacement:						
Replace Well LoFlo Pumps	5	25	EA	1,000.00	25,000.00	Replacement during active treatment (5th year of operation)
Replace Well LoFlo Pumps	10	25	EA	1,000.00	25,000.00	Replacement during active treatment (10th year of operation)
Replace Well Extract/LoFlo Pumps	15	100	EA	4,000.00	400,000.00	Replacement during active treatment (15th year of operation)
Replace Well LoFlo Pumps	20	25	EA	1,000.00	25,000.00	Replacement during active treatment (20th year of operation)
Replace Well Extract/LoFlo Pumps	25	100	EA	4,000.00	400,000.00	Replacement during active treatment (25th year of operation)
Replace Well LoFlo Pumps	30	25	EA	1,000.00	25,000.00	Replacement during active treatment (30th year of operation)
Well Repairs/Replacement:						
Replace Monitoring Wells	10	10	EA	17,000.00	170,000.00	Assume replace 10 wells every 10 yr.
Replace Monitoring Wells	20	10	EA	17,000.00	170,000.00	(Add 20K/event for demo/disposals)
Replace Monitoring Wells	30	10	EA	17,000.00	170,000.00	
Demolition/Restoration Site	35	1	JOB	500,000.00	500,000.00	<Includes removal of monitoring wells

PRESENT VALUE ANALYSIS:

COST TYPE:	YEAR	TOTAL COST	DISCOUNT FACTOR(7%)	PRESENT VALUE (2001)	NOTES
2003 ENGINEERING & DESIGN	2	1,139,944	0.87344	995,671	
2004 ENGINEERING/DESIGN/CONTRACTING	3	1,139,944	0.81630	930,534	
2005 CONTSTRUCTION STEP 1	4	8,621,901	0.76290	6,577,607	
2006 CONSTRUCTION/STARTUP STEP 1	5	6,252,918	0.71299	4,458,244	
2007 HEAT YEAR 1 STEP 1	6	4,409,334	0.66634	2,938,125	
2008 HEAT YEAR 2 STEP 1	7	3,525,700	0.62275	2,195,629	<Includes demo ERH system
2009 HEAT YEAR 3 STEP 1; CONSTRUCT STEP 2 WELLS	8	10,946,520	0.58201	6,370,974	
2010 HEAT YEAR 1 STEP 2	9	5,335,217	0.54393	2,902,005	
2011 HEAT YEAR 2 STEP 2; ENGR/CONSTRUCT UPGRADE	10	6,845,418	0.50835	3,479,863	
2012 HEAT YEAR 3 STEP 2; CONSTRUCT UPGRADE	11	10,602,784	0.47509	5,037,306	
2013 HEAT YEAR 1 STEP 3	12	5,956,434	0.44401	2,644,728	
2014 HEAT YEAR 2 STEP 3	13	4,932,995	0.41496	2,047,018	
2015 HEAT YEAR 3 STEP 3; WELLS FOR STEP 4	14	9,527,422	0.38782	3,694,899	
2016 HEAT YEAR 1 STEP 4	15	5,510,848	0.36245	1,997,385	
2017 HEAT YEAR 2 STEP 4	16	4,641,447	0.33873	1,572,219	
2018 HEAT YEAR 3 STEP 4	17	4,641,447	0.31657	1,469,363	
2019 COOL DOWN YEAR 1	18	2,589,655	0.29586	766,185	
2020 COOL DOWN YEAR 2	19	2,461,629	0.27651	680,661	
2021 COOL DOWN YEAR 3	20	2,553,189	0.25842	659,793	
2022 O&M MON. WELLS & DEMO TREATMENT SYSTEM	21	1,978,542	0.24151	477,844	<Includes demo GWTP, piping & wells
2023 O&M MONITORING WELLS 1ST YEAR	22	128,390	0.22571	28,979	
O&M MONITORING WELLS	23	128,390	0.21095	27,083	
O&M MONITORING WELLS	24	128,390	0.19715	25,312	
O&M MONITORING WELLS	25	128,390	0.18425	23,656	
O&M MONITORING WELLS	26	128,390	0.17220	22,108	
O&M MONITORING WELLS	27	128,390	0.16093	20,662	
O&M MONITORING WELLS	28	128,390	0.15040	19,310	
O&M MONITORING WELLS	29	128,390	0.14056	18,047	
O&M MONITORING WELLS	30	128,390	0.13137	16,866	
O&M MONITORING WELLS	31	128,390	0.12277	15,763	
O&M MONITORING WELLS	32	128,390	0.11474	14,732	
O&M MONITORING WELLS	33	128,390	0.10723	13,768	
O&M MONITORING WELLS	34	128,390	0.10022	12,867	
O&M MONITORING WELLS	35	128,390	0.09366	12,025	
Periodic Cost	10	30,000	0.50835	15,250	5th year of operation is year 10
Periodic Cost	15	200,000	0.36245	72,489	
Periodic Cost	20	405,000	0.25842	104,660	
Periodic Cost	25	200,000	0.18425	36,850	
Periodic Cost	30	405,000	0.13137	53,204	
Periodic Cost	35	800,000	0.09366	74,930	Restore Site/Abandon Wells

TOTAL COSTS ENGR/CONST + 30 YEARS OF OPERATION	107,450,748	
TOTAL PRESENT VALUE OF SCENARIO 1 - PHASED BY DEPTH		$ 52,524,614

APPENDIX F-2

Costlink© Scenario 1, Thermal Treatments by Depth Zone—Capital Costs and Operation & Maintenance Estimate

McCORMICK & BAXTER SUPERFUND SITE
THERMAL TREATMENT

SCENARIO 1
THERMAL TREATMENT PHASED BY DEPTH ZONE

Designed By: URS Corporation
Estimated By: URS Staff

Prepared By: John E. Spear

Preparation Date: 10/19/01
Effective Date of Pricing: 10/19/01
Est Construction Time: 600 Days

Sales Tax: 0.08

C o s t L i n k
Software Copyright (c) 1985-1998
by Building Systems Design, Inc.
Release 1.6c

CONTRACT DACA67-98-D-1005, DO #65 THERMAL TREATMENT TECHNOLOGY CONCEPTUAL DESIGN, COST ESTIMATION AND FOCUSED FEASIBILITY SUPPORT McCORMICK & BAXTER SUPERFUND SITE, STOCKTON, CALIFORNIA

SCENARIO 1, TREATMENT OF PRIORITY 1 SOILS ONLY INCLUDING:
MPA, CPA, & EAST PORTION OF N-MPA (IN OLD MORMON SLOUGH); EVALUATION OF THERMAL TREATMENT BASED ON PHASING BY DEPTH ZONE.

SUMMARY REPORTS SUMMARY PAGE

PROJECT OWNER SUMMARY - ACCOUNT....1
PROJECT OWNER SUMMARY - SYSTEM....2
PROJECT INDIRECT SUMMARY - ACCOUNT....9
PROJECT INDIRECT SUMMARY - SYSTEM....10
PROJECT DIRECT SUMMARY - ACCOUNT....20
PROJECT DIRECT SUMMARY - SYSTEM....21
CONTRACTOR INDIRECT SUMMARY....34

DETAILED ESTIMATE DETAIL PAGE

2003. ENGINEERING & DESIGN
12. ENGINEERING....1
2004. ENGINEERING/DESIGN/CONTRACTING
12. ENGINEERING....5
2005. CONSTRUCTION STEP 1
05. GENERAL CONDITIONS....9
10. SUBMITTALS/IMPLEMENTATION PLANS....14
15. MOBE, SITE WORK, TEMP FACILITIES....19
20. TREATMENT SYSTEM CONSTRUCTION....28
2006. CONSTRUCTION/STARTUP STEP 1
05. GENERAL CONDITIONS....41
20. TREATMENT SYSTEM CONSTRUCTION....45
25. START UP, TESTING, O&M PLAN....59
30. DEMOBILIZATION....70
2007. HEAT YR1 STEP 1
5. GENERAL CONDITIONS....74
10. SITE FACILITIES....75
15. HEALTH & SAFETY....76
20. MATERIALS & SUPPLIES....76
25. MAINTENANCE....77
30. UTILITIES....77
35. SITE O&M LABOR & MISC EQUIPMENT....78
40. CHEMICALS....78
45. DISPOSALS....79
49. SAMPLING & ANALYSIS....80
55. QC & ANALYTICAL DATA VALIDATION....85
2008. HEAT YR2 STEP 1
5. GENERAL CONDITIONS....86
10. SITE FACILITIES....87
15. HEALTH & SAFETY....88
20. MATERIALS & SUPPLIES....88
25. MAINTENANCE....88
30. UTILITIES....89
35. SITE O&M LABOR & MISC EQUIPMENT....89
40. CHEMICALS....90
45. DISPOSALS....90
49. SAMPLING & ANALYSIS....92
55. QC & ANALYTICAL DATA VALIDATION....96
2009. HEAT YR3 STEP 1 & WELLS STEP 2
5. GENERAL CONDITIONS....98

DETAILED ESTIMATE DETAIL PAGE

10. SITE FACILITIES....100
12. ENGINEEERING....100
15. HEALTH & SAFETY....101
20. MATERIALS & SUPPLIES....101
25. MAINTENANCE....101
30. UTILITIES....102
35. SITE O&M LABOR & MISC EQUIPMENT....102
40. CHEMICALS....103
45. DISPOSALS....103
49. SAMPLING & ANALYSIS....105
55. QC & ANALYTICAL DATA VALIDATION....109
60. TREATMENT SYSTEM CONSTRUCTION....110
2010. HEAT YR1 STEP 2
5. GENERAL CONDITIONS....124
10. SITE FACILITIES....125
12. ENGINEEERING....126
15. HEALTH & SAFETY....126
20. MATERIALS & SUPPLIES....126
25. MAINTENANCE....126
30. UTILITIES....127
35. SITE O&M LABOR & MISC EQUIPMENT....127
40. CHEMICALS....128
45. DISPOSALS....128
49. SAMPLING & ANALYSIS....130
55. QC & ANALYTICAL DATA VALIDATION....135
60. DEMOBE/DEMO SPH 6PH COMPONENTS....136
2011. HEAT YR 2 STEP 2
5. GENERAL CONDITIONS....137
10. SITE FACILITIES....138
15. HEALTH & SAFETY....139
20. MATERIALS & SUPPLIES....139
25. MAINTENANCE....139
30. UTILITIES....140
35. SITE O&M LABOR & MISC EQUIPMENT....140
40. CHEMICALS....140
45. DISPOSALS....141
49. SAMPLING & ANALYSIS....143
55. QC & ANALYTICAL DATA VALIDATION....147
60. TREATMENT SYSTEM CONSTRUCTION....148
2012. HEAT YR 3 STEP 2 & WELLS STEP 3
5. GENERAL CONDITIONS....158
10. SITE FACILITIES....160
15. HEALTH & SAFETY....160
20. MATERIALS & SUPPLIES....161
25. MAINTENANCE....161
30. UTILITIES....161
35. SITE O&M LABOR & MISC EQUIPMENT....162
40. CHEMICALS....162
45. DISPOSALS....163
49. SAMPLING & ANALYSIS....165
55. QC & ANALYTICAL DATA VALIDATION....169

DETAILED ESTIMATE DETAIL PAGE

60. TREATMENT SYSTEM CONSTRUCTION....170
65. START UP, TESTING, O&M PLAN....186
70. DEMOBILIZATION....196
2013. HEAT YR1 STEP 3
5. GENERAL CONDITIONS....200
10. SITE FACILITIES....201
15. HEALTH & SAFETY....202
20. MATERIALS & SUPPLIES....202
25. MAINTENANCE....202
30. UTILITIES....203
35. SITE O&M LABOR & MISC EQUIPMENT....203
40. CHEMICALS....203
45. DISPOSALS....204
49. SAMPLING & ANALYSIS....206
55. QC & ANALYTICAL DATA VALIDATION....211
2014. HEAT YR2 STEP 3
5. GENERAL CONDITIONS....213
10. SITE FACILITIES....214
15. HEALTH & SAFETY....215
20. MATERIALS & SUPPLIES....215
25. MAINTENANCE....215
30. UTILITIES....216
35. SITE O&M LABOR & MISC EQUIPMENT....216
40. CHEMICALS....216
45. DISPOSALS....217
49. SAMPLING & ANALYSIS....219
55. QC & ANALYTICAL DATA VALIDATION....223
2015. HEAT YR3 STEP 3 & WELLS STEP 4
5. GENERAL CONDITIONS....225
10. SITE FACILITIES....227
15. HEALTH & SAFETY....227
20. MATERIALS & SUPPLIES....228
25. MAINTENANCE....228
30. UTILITIES....228
35. SITE O&M LABOR & MISC EQUIPMENT....229
40. CHEMICALS....229
45. DISPOSALS....230
49. SAMPLING & ANALYSIS....232
55. QC & ANALYTICAL DATA VALIDATION....236
60. TREATMENT SYSTEM CONSTRUCTION....237
2016. HEAT YR1 STEP 4
5. GENERAL CONDITIONS....250
10. SITE FACILITIES....251
15. HEALTH & SAFETY....252
20. MATERIALS & SUPPLIES....252
25. MAINTENANCE....252
30. UTILITIES....253
35. SITE O&M LABOR & MISC EQUIPMENT....253
40. CHEMICALS....253
45. DISPOSALS....254
49. SAMPLING & ANALYSIS....256

DETAILED ESTIMATE DETAIL PAGE

55. QC & ANALYTICAL DATA VALIDATION.....261
2017. HEAT YR2 STEP 4
5. GENERAL CONDITIONS.....263
10. SITE FACILITIES.....264
15. HEALTH & SAFETY.....265
20. MATERIALS & SUPPLIES.....265
25. MAINTENANCE.....265
30. UTILITIES.....266
35. SITE O&M LABOR & MISC EQUIPMENT.....266
40. CHEMICALS.....266
45. DISPOSALS.....267
49. SAMPLING & ANALYSIS.....269
55. QC & ANALYTICAL DATA VALIDATION.....273
2018. HEAT YR3 STEP 4
5. GENERAL CONDITIONS.....275
10. SITE FACILITIES.....276
15. HEALTH & SAFETY.....277
20. MATERIALS & SUPPLIES.....277
25. MAINTENANCE.....277
30. UTILITIES.....278
35. SITE O&M LABOR & MISC EQUIPMENT.....278
40. CHEMICALS.....278
45. DISPOSALS.....279
49. SAMPLING & ANALYSIS.....281
55. QC & ANALYTICAL DATA VALIDATION.....285
2019. COOL DOWN YEAR 1
5. GENERAL CONDITIONS.....287
10. SITE FACILITIES.....288
15. HEALTH & SAFETY.....289
20. MATERIALS & SUPPLIES.....289
25. MAINTENANCE.....289
30. UTILITIES.....290
35. SITE O&M LABOR & MISC EQUIPMENT.....290
40. CHEMICALS.....290
45. DISPOSALS.....291
49. SAMPLING & ANALYSIS.....292
55. QC & ANALYTICAL DATA VALIDATION.....297
60. REMOVE/DEMO STEAM EQUIPMENT.....297
2020. COOL DOWN YEAR 2
5. GENERAL CONDITIONS.....299
10. SITE FACILITIES.....300
15. HEALTH & SAFETY.....301
20. MATERIALS & SUPPLIES.....301
25. MAINTENANCE.....301
30. UTILITIES.....302
35. SITE O&M LABOR & MISC EQUIPMENT.....302
40. CHEMICALS.....302
45. DISPOSALS.....303
49. SAMPLING & ANALYSIS.....304
55. QC & ANALYTICAL DATA VALIDATION.....309
2021. COOL DOWN YEAR 3

DETAILED ESTIMATE DETAIL PAGE

5. GENERAL CONDITIONS.....310
10. SITE FACILITIES.....311
15. HEALTH & SAFETY.....312
20. MATERIALS & SUPPLIES.....312
25. MAINTENANCE.....312
30. UTILITIES.....313
35. SITE O&M LABOR & MISC EQUIPMENT.....313
40. CHEMICALS.....313
45. DISPOSALS.....314
49. SAMPLING & ANALYSIS.....315
55. QC & ANALYTICAL DATA VALIDATION.....321
2022. O&M MON WELLS & DEMO TREAT SYS.
5. GENERAL CONDITIONS.....322
49. SAMPLING & ANALYSIS.....323
55. QC & ANALYTICAL DATA VALIDATION.....324
60. DEMO/REMOVAL TREATMENT SYSTEM.....325
2023. TYP. O&M MONITORING WELLS
5. GENERAL CONDITIONS.....332
49. SAMPLING & ANALYSIS.....333
55. QC & ANALYTICAL DATA VALIDATION.....334

BACKUP REPORTS BACKUP PAGE

CREW BACKUP.....1
LABOR BACKUP.....8
EQUIPMENT BACKUP.....9

* * * END TABLE OF CONTENTS * * *

** PROJECT OWNER SUMMARY - ACCOUNT **

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2003	ENGINEERING & DESIGN	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
2004	ENGINEERING/DESIGN/CONTRACTING	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
2005	CONSTRUCTION STEP 1	1.00	JOB	7,219,008	624,987	777,905	8,621,901	8621900.52	
2006	CONSTRUCTION/STARTUP STEP 1	1.00	JOB	5,203,919	480,552	568,447	6,252,918	6252917.68	
2007	HEAT YR1 STEP 1	1.00	JOB	3,710,418	340,007	358,908	4,409,334	4409333.74	
2008	HEAT YR2 STEP 1	1.00	JOB	2,944,077	283,671	297,953	3,525,700	3525700.38	
2009	HEAT YR3 STEP 1 & WELLS STEP 2	1.00	JOB	9,093,429	889,352	963,739	10,946,520	10946520.07	
2010	HEAT YR1 STEP 2	1.00	JOB	4,443,889	433,652	457,677	5,335,217	5335217.40	
2011	HEAT YR 2 STEP 2	1.00	JOB	5,687,763	558,039	599,616	6,845,418	6845418.24	
2012	HEAT YR 3 STEP 2 & WELLS STEP 3	1.00	JOB	8,809,350	860,944	932,490	10,602,784	10602784.25	
2013	HEAT YR1 STEP 3	1.00	JOB	4,957,408	485,004	514,022	5,956,434	5956434.19	
2014	HEAT YR2 STEP 3	1.00	JOB	4,107,131	399,976	425,888	4,932,995	4932995.38	
2015	HEAT YR3 STEP 3 & WELLS STEP 4	1.00	JOB	7,920,738	772,083	834,601	9,527,422	9527422.07	
2016	HEAT YR1 STEP 4	1.00	JOB	4,589,038	448,167	473,643	5,510,848	5510847.66	
2017	HEAT YR2 STEP 4	1.00	JOB	3,866,182	375,881	399,384	4,641,447	4641446.81	
2018	HEAT YR3 STEP 4	1.00	JOB	3,866,182	375,881	399,384	4,641,447	4641446.81	
2019	COOL DOWN YEAR 1	1.00	JOB	2,171,092	205,066	213,498	2,589,655	2589655.02	
2020	COOL DOWN YEAR 2	1.00	JOB	2,063,623	196,147	201,859	2,461,629	2461629.40	
2021	COOL DOWN YEAR 3	1.00	JOB	2,143,083	204,093	206,012	2,553,188	2553188.51	
2022	O&M MON WELLS & DEMO TREAT SYS.	1.00	JOB	1,713,471	170,855	94,216	1,978,542	1978541.57	
2023	TYP. O&M MONITORING WELLS	1.00	JOB	111,608	10,668	6,114	128,390	128389.98	
TOTAL	McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	86,505,612	8,303,446	8,932,620	103,741,678	103741678.18	

** PROJECT OWNER SUMMARY - SYSTEM **

	QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2003 ENGINEERING & DESIGN								
2003.12 ENGINEERING	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
TOTAL ENGINEERING & DESIGN	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
2004 ENGINEERING/DESIGN/CONTRACTING								
2004.12 ENGINEERING	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
TOTAL ENGINEERING/DESIGN/CONTRACTING	1.00	JOB	942,103	94,210	103,631	1,139,944	1139944.25	
2005 CONSTRUCTION STEP 1								
2005.05 GENERAL CONDITIONS	1.00	JOB	1,814,580	90,729	190,531	2,095,840	2095839.64	
2005.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	123,696	6,185	6,494	136,375	136375.13	
2005.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	869,925	86,992	95,692	1,052,609	1052608.99	
2005.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	4,410,807	441,081	485,189	5,337,077	5337076.76	
TOTAL CONSTRUCTION STEP 1	1.00	JOB	7,219,008	624,987	777,905	8,621,901	8621900.52	
2006 CONSTRUCTION/STARTUP STEP 1								
2006.05 GENERAL CONDITIONS	1.00	JOB	796,808	39,840	83,665	920,313	920313.46	
2006.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	3,533,686	353,369	388,705	4,275,760	4275760.33	
2006.25 START UP, TESTING, O&M PLAN	1.00	JOB	686,745	68,674	75,542	830,961	830961.10	
2006.30 DEMOBILIZATION	1.00	JOB	186,680	18,668	20,535	225,883	225882.79	
TOTAL CONSTRUCTION/STARTUP STEP 1	1.00	JOB	5,203,919	480,552	568,447	6,252,918	6252917.68	
2007 HEAT YR1 STEP 1								
2007. 5 GENERAL CONDITIONS	12.00	MO	527,920	26,396	27,716	582,031	48502.62	
2007.10 SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2007.15 HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2007.20 MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2007.25 MAINTENANCE	12.00	MO	35,741	3,574	3,931	43,246	3603.87	
2007.30 UTILITIES	12.00	MO	1,517,671	151,767	166,944	1,836,382	153031.87	
2007.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2007.40 CHEMICALS	12.00	MO	30,583	3,058	3,364	37,005	3083.76	
2007.45 DISPOSALS	12.00	MO	122,664	12,266	13,493	148,423	12368.59	
2007.49 SAMPLING & ANALYSIS	12.00	MO	246,336	24,634	13,548	284,518	23709.86	
2007.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR1 STEP 1	1.00	JOB	3,710,418	340,007	358,908	4,409,334	4409333.74	

** PROJECT OWNER SUMMARY - SYSTEM **

		QUANTY UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2008	HEAT YR2 STEP 1							
2008. 5	GENERAL CONDITIONS	12.00 MO	121,970	6,098	6,403	134,472	11205.97	
2008.10	SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2008.15	HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2008.20	MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2008.25	MAINTENANCE	12.00 MO	35,741	3,574	3,931	43,246	3603.87	
2008.30	UTILITIES	12.00 MO	1,157,280	115,728	127,301	1,400,309	116692.42	
2008.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2008.40	CHEMICALS	12.00 MO	30,583	3,058	3,364	37,005	3083.76	
2008.45	DISPOSALS	12.00 MO	122,664	12,266	13,493	148,423	12368.59	
2008.49	SAMPLING & ANALYSIS	12.00 MO	246,336	24,634	13,548	284,518	23709.86	
2008.55	QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL	HEAT YR2 STEP 1	1.00 JOB	2,944,077	283,671	297,953	3,525,700	3525700.38	
2009	HEAT YR3 STEP 1 & WELLS STEP 2							
2009. 5	GENERAL CONDITIONS	12.00 MO	307,048	15,352	16,120	338,521	28210.07	
2009.10	SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2009.12	ENGINEEERING		772,789	77,279	85,007	935,075		
2009.15	HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2009.20	MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2009.25	MAINTENANCE	12.00 MO	35,741	3,574	3,931	43,246	3603.87	
2009.30	UTILITIES	12.00 MO	1,157,280	115,728	127,301	1,400,309	116692.42	
2009.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2009.40	CHEMICALS	12.00 MO	30,583	3,058	3,364	37,005	3083.76	
2009.45	DISPOSALS	12.00 MO	122,664	12,266	13,493	148,423	12368.59	
2009.49	SAMPLING & ANALYSIS	12.00 MO	246,336	24,634	13,548	284,518	23709.86	
2009.55	QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	
2009.60	TREATMENT SYSTEM CONSTRUCTION		5,191,484	519,148	571,063	6,281,696		
TOTAL	HEAT YR3 STEP 1 & WELLS STEP 2	1.00 JOB	9,093,429	889,352	963,739	10,946,520	10946520.07	
2010	HEAT YR1 STEP 2							
2010. 5	GENERAL CONDITIONS	12.00 MO	121,970	6,098	6,403	134,472	11205.97	
2010.10	SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2010.12	ENGINEEERING		772,789	77,279	85,007	935,075		
2010.15	HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2010.20	MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2010.25	MAINTENANCE	12.00 MO	38,905	3,890	4,280	47,075	3922.90	
2010.30	UTILITIES	12.00 MO	1,723,488	172,349	189,584	2,085,421	173785.06	
2010.35	SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2010.40	CHEMICALS	12.00 MO	38,484	3,848	4,233	46,565	3880.43	
2010.45	DISPOSALS	12.00 MO	132,978	13,298	14,628	160,903	13408.57	
2010.49	SAMPLING & ANALYSIS	12.00 MO	341,885	34,188	18,804	394,877	32906.42	
2010.55	QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	

** PROJECT OWNER SUMMARY - SYSTEM **

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2010.60	DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	43,887	4,389	4,828	53,104	53103.73	
TOTAL HEAT YR1 STEP 2		1.00	JOB	4,443,889	433,652	457,677	5,335,217	5335217.40	
2011	HEAT YR 2 STEP 2								
2011. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2011.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2011.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2011.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2011.25	MAINTENANCE	12.00	MO	47,108	4,711	5,182	57,000	4750.01	
2011.30	UTILITIES	12.00	MO	1,313,175	131,318	144,449	1,588,942	132411.86	
2011.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2011.40	CHEMICALS	12.00	MO	37,896	3,790	4,169	45,855	3821.23	
2011.45	DISPOSALS	12.00	MO	127,107	12,711	13,982	153,799	12816.59	
2011.49	SAMPLING & ANALYSIS	12.00	MO	248,914	24,891	13,690	287,496	23957.99	
2011.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
2011.60	TREATMENT SYSTEM CONSTRUCTION			2,562,089	256,209	281,830	3,100,128		
TOTAL HEAT YR 2 STEP 2		1.00	JOB	5,687,763	558,039	599,616	6,845,418	6845418.24	
2012	HEAT YR 3 STEP 2 & WELLS STEP 3								
2012. 5	GENERAL CONDITIONS	12.00	MO	307,048	15,352	16,120	338,521	28210.07	
2012.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2012.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2012.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2012.25	MAINTENANCE	12.00	MO	47,108	4,711	5,182	57,000	4750.01	
2012.30	UTILITIES	12.00	MO	1,313,175	131,318	144,449	1,588,942	132411.86	
2012.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2012.40	CHEMICALS	12.00	MO	37,896	3,790	4,169	45,855	3821.23	
2012.45	DISPOSALS	12.00	MO	127,107	12,711	13,982	153,799	12816.59	
2012.49	SAMPLING & ANALYSIS	12.00	MO	246,336	24,634	13,548	284,518	23709.86	
2012.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
2012.60	TREATMENT SYSTEM CONSTRUCTION			4,813,480	481,348	529,483	5,824,311		
2012.65	START UP, TESTING, O&M PLAN	1.00	JOB	501,015	50,101	55,112	606,228	606227.93	
2012.70	DEMOBILIZATION	1.00	JOB	186,680	18,668	20,535	225,883	225882.79	
TOTAL HEAT YR 3 STEP 2 & WELLS STEP 3		1.00	JOB	8,809,350	860,944	932,490	10,602,784	10602784.25	
2013	HEAT YR1 STEP 3								
2013. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2013.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2013.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2013.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2013.25	MAINTENANCE	12.00	MO	57,420	5,742	6,316	69,478	5789.82	
2013.30	UTILITIES	12.00	MO	2,994,803	299,480	329,428	3,623,712	301975.99	

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2013.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2013.40	CHEMICALS	12.00	MO	63,596	6,360	6,996	76,951	6412.56	
2013.45	DISPOSALS	12.00	MO	145,654	14,565	16,022	176,241	14686.74	
2013.49	SAMPLING & ANALYSIS	12.00	MO	344,463	34,446	18,945	397,855	33154.55	
2013.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR1 STEP 3		1.00	JOB	4,957,408	485,004	514,022	5,956,434	5956434.19	
2014	HEAT YR2 STEP 3								
2014. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2014.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2014.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2014.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2014.25	MAINTENANCE	12.00	MO	57,420	5,742	6,316	69,478	5789.82	
2014.30	UTILITIES	12.00	MO	2,247,937	224,794	247,273	2,720,004	226667.01	
2014.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2014.40	CHEMICALS	12.00	MO	64,182	6,418	7,060	77,660	6471.63	
2014.45	DISPOSALS	12.00	MO	139,783	13,978	15,376	169,137	14094.76	
2014.49	SAMPLING & ANALYSIS	12.00	MO	246,336	24,634	13,548	284,518	23709.86	
2014.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR2 STEP 3		1.00	JOB	4,107,131	399,976	425,888	4,932,995	4932995.38	
2015	HEAT YR3 STEP 3 & WELLS STEP 4								
2015. 5	GENERAL CONDITIONS	12.00	MO	307,048	15,352	16,120	338,521	28210.07	
2015.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2015.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2015.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2015.25	MAINTENANCE	12.00	MO	57,420	5,742	6,316	69,478	5789.82	
2015.30	UTILITIES	12.00	MO	2,247,937	224,794	247,273	2,720,004	226667.01	
2015.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2015.40	CHEMICALS	12.00	MO	63,596	6,360	6,996	76,951	6412.56	
2015.45	DISPOSALS	12.00	MO	139,783	13,978	15,376	169,137	14094.76	
2015.49	SAMPLING & ANALYSIS	12.00	MO	248,914	24,891	13,690	287,496	23957.99	
2015.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	27,147	1,357	1,425	29,929	2494.10	
2015.60	TREATMENT SYSTEM CONSTRUCTION			3,626,536	362,654	398,919	4,388,109		
TOTAL HEAT YR3 STEP 3 & WELLS STEP 4		1.00	JOB	7,920,738	772,083	834,601	9,527,422	9527422.07	
2016	HEAT YR1 STEP 4								
2016. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2016.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2016.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2016.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2016.25	MAINTENANCE	12.00	MO	66,794	6,679	7,347	80,821	6735.09	

** PROJECT OWNER SUMMARY - SYSTEM **

	QUANTY UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2016.30 UTILITIES	12.00 MO	2,576,702	257,670	283,437	3,117,809	259817.43	
2016.35 SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2016.40 CHEMICALS	12.00 MO	92,305	9,231	10,154	111,690	9307.46	
2016.45 DISPOSALS	12.00 MO	159,878	15,988	17,587	193,452	16121.03	
2016.49 SAMPLING & ANALYSIS	12.00 MO	341,885	34,188	18,804	394,877	32906.42	
2016.55 QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR1 STEP 4	1.00 JOB	4,589,038	448,167	473,643	5,510,848	5510847.66	
2017 HEAT YR2 STEP 4							
2017. 5 GENERAL CONDITIONS	12.00 MO	121,970	6,098	6,403	134,472	11205.97	
2017.10 SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2017.15 HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2017.20 MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2017.25 MAINTENANCE	12.00 MO	66,794	6,679	7,347	80,821	6735.09	
2017.30 UTILITIES	12.00 MO	1,955,265	195,527	215,079	2,365,871	197155.90	
2017.35 SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2017.40 CHEMICALS	12.00 MO	92,305	9,231	10,154	111,690	9307.46	
2017.45 DISPOSALS	12.00 MO	154,007	15,401	16,941	186,349	15529.05	
2017.49 SAMPLING & ANALYSIS	12.00 MO	246,336	24,634	13,548	284,518	23709.86	
2017.55 QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR2 STEP 4	1.00 JOB	3,866,182	375,881	399,384	4,641,447	4641446.81	
2018 HEAT YR3 STEP 4							
2018. 5 GENERAL CONDITIONS	12.00 MO	121,970	6,098	6,403	134,472	11205.97	
2018.10 SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2018.15 HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2018.20 MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2018.25 MAINTENANCE	12.00 MO	66,794	6,679	7,347	80,821	6735.09	
2018.30 UTILITIES	12.00 MO	1,955,265	195,527	215,079	2,365,871	197155.90	
2018.35 SITE O&M LABOR & MISC EQUIPMENT	12.00 MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2018.40 CHEMICALS	12.00 MO	92,305	9,231	10,154	111,690	9307.46	
2018.45 DISPOSALS	12.00 MO	154,007	15,401	16,941	186,349	15529.05	
2018.49 SAMPLING & ANALYSIS	12.00 MO	246,336	24,634	13,548	284,518	23709.86	
2018.55 QC & ANALYTICAL DATA VALIDATION	12.00 MO	27,147	1,357	1,425	29,929	2494.10	
TOTAL HEAT YR3 STEP 4	1.00 JOB	3,866,182	375,881	399,384	4,641,447	4641446.81	
2019 COOL DOWN YEAR 1							
2019. 5 GENERAL CONDITIONS	12.00 MO	121,970	6,098	6,403	134,472	11205.97	
2019.10 SITE FACILITIES	12.00 MO	54,514	2,726	2,862	60,101	5008.43	
2019.15 HEALTH & SAFETY	12.00 MO	11,109	555	583	12,248	1020.63	
2019.20 MATERIALS & SUPPLIES	12.00 MO	4,219	422	464	5,104	425.37	
2019.25 MAINTENANCE	12.00 MO	82,122	8,212	9,033	99,367	8280.62	

		QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2019.30	UTILITIES	12.00	MO	240,140	24,014	26,415	290,569	24214.10	
2019.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2019.40	CHEMICALS	12.00	MO	40,396	4,040	4,444	48,880	4073.31	
2019.45	DISPOSALS	12.00	MO	187,333	18,733	20,607	226,673	18889.45	
2019.49	SAMPLING & ANALYSIS	12.00	MO	243,495	24,349	13,392	281,236	23436.35	
2019.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	16,706	835	877	18,418	1534.83	
2019.60	REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	36,573	1,829	3,840	42,242	3520.15	
TOTAL	COOL DOWN YEAR 1	1.00	JOB	2,171,092	205,066	213,498	2,589,655	2589655.02	
2020	COOL DOWN YEAR 2								
2020. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2020.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2020.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2020.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2020.25	MAINTENANCE	12.00	MO	82,122	8,212	9,033	99,367	8280.62	
2020.30	UTILITIES	12.00	MO	169,830	16,983	18,681	205,494	17124.53	
2020.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2020.40	CHEMICALS	12.00	MO	39,811	3,981	4,379	48,171	4014.23	
2020.45	DISPOSALS	12.00	MO	187,333	18,733	20,607	226,673	18889.45	
2020.49	SAMPLING & ANALYSIS	12.00	MO	243,495	24,349	13,392	281,236	23436.35	
2020.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	16,706	835	877	18,418	1534.83	
TOTAL	COOL DOWN YEAR 2	1.00	JOB	2,063,623	196,147	201,859	2,461,629	2461629.40	
2021	COOL DOWN YEAR 3								
2021. 5	GENERAL CONDITIONS	12.00	MO	121,970	6,098	6,403	134,472	11205.97	
2021.10	SITE FACILITIES	12.00	MO	54,514	2,726	2,862	60,101	5008.43	
2021.15	HEALTH & SAFETY	12.00	MO	11,109	555	583	12,248	1020.63	
2021.20	MATERIALS & SUPPLIES	12.00	MO	4,219	422	464	5,104	425.37	
2021.25	MAINTENANCE	12.00	MO	82,122	8,212	9,033	99,367	8280.62	
2021.30	UTILITIES	12.00	MO	169,830	16,983	18,681	205,494	17124.53	
2021.35	SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	1,132,516	113,252	124,577	1,370,344	114195.37	
2021.40	CHEMICALS	12.00	MO	37,027	3,703	4,073	44,803	3733.60	
2021.45	DISPOSALS	12.00	MO	186,155	18,615	20,477	225,247	18770.59	
2021.49	SAMPLING & ANALYSIS	12.00	MO	326,917	32,692	17,980	377,589	31465.77	
2021.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	16,706	835	877	18,418	1534.83	
TOTAL	COOL DOWN YEAR 3	1.00	JOB	2,143,083	204,093	206,012	2,553,189	2553188.51	
2022	O&M MON WELLS & DEMO TREAT SYS.								
2022. 5	GENERAL CONDITIONS	12.00	MO	7,065	353	371	7,789	649.12	
2022.49	SAMPLING & ANALYSIS	12.00	MO	101,758	10,176	5,597	117,531	9794.24	
2022.55	QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,784	139	146	3,070	255.80	

** PROJECT OWNER SUMMARY - SYSTEM **

	QUANTY	UOM	CONTRACT	SCP CONT	BID CONT	TOTAL COST	UNIT COST	NOTES
2022.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,601,863	160,186	88,102	1,850,152	154179.30	
TOTAL O&M MON WELLS & DEMO TREAT SYS.	1.00	JOB	1,713,471	170,855	94,216	1,978,542	1978541.57	
2023 TYP. O&M MONITORING WELLS								
2023. 5 GENERAL CONDITIONS	12.00	MO	7,065	353	371	7,789	649.12	
2023.49 SAMPLING & ANALYSIS	12.00	MO	101,758	10,176	5,597	117,531	9794.24	
2023.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,784	139	146	3,070	255.80	
TOTAL TYP. O&M MONITORING WELLS	1.00	JOB	111,608	10,668	6,114	128,390	128389.98	

** PROJECT INDIRECT SUMMARY - ACCOUNT **

		QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
2003	ENGINEERING & DESIGN	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
2004	ENGINEERING/DESIGN/CONTRACTING	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
2005	CONSTRUCTION STEP 1	1.00	JOB	6,160,457	369,627	653,008	35,915	7,219,008	7219008.07
2006	CONSTRUCTION/STARTUP STEP 1	1.00	JOB	4,440,848	266,451	470,730	25,890	5,203,919	5203919.12
2007	HEAT YR1 STEP 1	1.00	JOB	3,166,345	189,981	335,633	18,460	3,710,418	3710418.41
2008	HEAT YR2 STEP 1	1.00	JOB	2,512,376	150,743	266,312	14,647	2,944,077	2944077.10
2009	HEAT YR3 STEP 1 & WELLS STEP 2	1.00	JOB	7,760,024	465,601	822,563	45,241	9,093,429	9093428.87
2010	HEAT YR1 STEP 2	1.00	JOB	3,792,264	227,536	401,980	22,109	4,443,889	4443888.83
2011	HEAT YR 2 STEP 2	1.00	JOB	4,853,744	291,225	514,497	28,297	5,687,763	5687762.76
2012	HEAT YR 3 STEP 2 & WELLS STEP 3	1.00	JOB	7,517,600	451,056	796,866	43,828	8,809,350	8809349.68
2013	HEAT YR1 STEP 3	1.00	JOB	4,230,484	253,829	448,431	24,664	4,957,408	4957408.32
2014	HEAT YR2 STEP 3	1.00	JOB	3,504,886	210,293	371,518	20,433	4,107,131	4107130.82
2015	HEAT YR3 STEP 3 & WELLS STEP 4	1.00	JOB	6,759,289	405,557	716,485	39,407	7,920,738	7920737.79
2016	HEAT YR1 STEP 4	1.00	JOB	3,916,129	234,968	415,110	22,831	4,589,038	4589037.81
2017	HEAT YR2 STEP 4	1.00	JOB	3,299,268	197,956	349,722	19,235	3,866,182	3866181.58
2018	HEAT YR3 STEP 4	1.00	JOB	3,299,268	197,956	349,722	19,235	3,866,182	3866181.58
2019	COOL DOWN YEAR 1	1.00	JOB	1,852,736	111,164	196,390	10,801	2,171,092	2171091.52
2020	COOL DOWN YEAR 2	1.00	JOB	1,761,026	105,662	186,669	10,267	2,063,623	2063622.82
2021	COOL DOWN YEAR 3	1.00	JOB	1,828,835	109,730	193,856	10,662	2,143,083	2143083.44
2022	O&M MON WELLS & DEMO TREAT SYS.	1.00	JOB	1,462,218	87,733	154,995	8,525	1,713,471	1713470.70
2023	TYP. O&M MONITORING WELLS	1.00	JOB	95,242	5,715	10,096	555	111,608	111607.85
TOTAL McCORMICK&BAXTER SUPERFUND SITE		1.00	EA	73,820,957	4,429,257	7,825,021	430,376	86,505,612	86505612.47
Scope Contingency		9.60	%					8,303,446	
SUBTOTAL								94,809,059	
Bid Contingency		9.42	%					8,932,620	
TOTAL INCL OWNER COSTS								103,741,678	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
2003 ENGINEERING & DESIGN								
2003.12 ENGINEERING	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
TOTAL ENGINEERING & DESIGN	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
Scope Contingency	10.00	%					94,210	
SUBTOTAL							1,036,313	
Bid Contingency	10.00	%					103,631	
TOTAL INCL OWNER COSTS							1,139,944	
2004 ENGINEERING/DESIGN/CONTRACTING								
2004.12 ENGINEERING	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
TOTAL ENGINEERING/DESIGN/CONTRACTING	1.00	JOB	803,959	48,238	85,220	4,687	942,103	942102.69
Scope Contingency	10.00	%					94,210	
SUBTOTAL							1,036,313	
Bid Contingency	10.00	%					103,631	
TOTAL INCL OWNER COSTS							1,139,944	
2005 CONSTRUCTION STEP 1								
2005.05 GENERAL CONDITIONS	1.00	JOB	1,548,501	92,910	164,141	9,028	1,814,580	1814579.78
2005.10 SUBMITTALS/IMPLEMENTATION PLANS	1.00	JOB	105,558	6,333	11,189	615	123,696	123696.27
2005.15 MOBE, SITE WORK, TEMP FACILITIES	1.00	JOB	742,364	44,542	78,691	4,328	869,925	869924.79
2005.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	3,764,033	225,842	398,988	21,944	4,410,807	4410807.24
TOTAL CONSTRUCTION STEP 1	1.00	JOB	6,160,457	369,627	653,008	35,915	7,219,008	7219008.07
Scope Contingency	8.66	%					624,987	
SUBTOTAL							7,843,995	
Bid Contingency	9.92	%					777,905	
TOTAL INCL OWNER COSTS							8,621,901	
2006 CONSTRUCTION/STARTUP STEP 1								
2006.05 GENERAL CONDITIONS	1.00	JOB	679,969	40,798	72,077	3,964	796,808	796808.19
2006.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	3,015,528	180,932	319,646	17,581	3,533,686	3533686.22
2006.25 START UP, TESTING, O&M PLAN	1.00	JOB	586,045	35,163	62,121	3,417	686,745	686744.71

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
2006.30 DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
TOTAL CONSTRUCTION/STARTUP STEP 1	1.00	JOB	4,440,848	266,451	470,730	25,890	5,203,919	5203919.12
Scope Contingency	9.23	%					480,552	
SUBTOTAL							5,684,471	
Bid Contingency	10.00	%					568,447	
TOTAL INCL OWNER COSTS							6,252,918	
2007 HEAT YR1 STEP 1								
2007. 5 GENERAL CONDITIONS	12.00	MO	450,509	27,031	47,754	2,626	527,920	43993.31
2007.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2007.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2007.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2007.25 MAINTENANCE	12.00	MO	30,500	1,830	3,233	178	35,741	2978.40
2007.30 UTILITIES	12.00	MO	1,295,129	77,708	137,284	7,551	1,517,671	126472.62
2007.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2007.40 CHEMICALS	12.00	MO	26,098	1,566	2,766	152	30,583	2548.56
2007.45 DISPOSALS	12.00	MO	104,677	6,281	11,096	610	122,664	10221.97
2007.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2007.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR1 STEP 1	1.00	JOB	3,166,345	189,981	335,633	18,460	3,710,418	3710418.41
Scope Contingency	9.16	%					340,007	
SUBTOTAL							4,050,426	
Bid Contingency	8.86	%					358,908	
TOTAL INCL OWNER COSTS							4,409,334	
2008 HEAT YR2 STEP 1								
2008. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2008.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2008.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2008.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2008.25 MAINTENANCE	12.00	MO	30,500	1,830	3,233	178	35,741	2978.40
2008.30 UTILITIES	12.00	MO	987,584	59,255	104,684	5,758	1,157,280	96440.02
2008.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2008.40 CHEMICALS	12.00	MO	26,098	1,566	2,766	152	30,583	2548.56
2008.45 DISPOSALS	12.00	MO	104,677	6,281	11,096	610	122,664	10221.97
2008.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2008.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR2 STEP 1	1.00	JOB	2,512,376	150,743	266,312	14,647	2,944,077	2944077.10

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	9.64	%					283,671	
SUBTOTAL							3,227,748	
Bid Contingency	9.23	%					297,953	
TOTAL INCL OWNER COSTS							3,525,700	
2009 HEAT YR3 STEP 1 & WELLS STEP 2								
2009. 5 GENERAL CONDITIONS	12.00	MO	262,025	15,721	27,775	1,528	307,048	25587.36
2009.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2009.12 ENGINEEERING			659,472	39,568	69,904	3,845	772,789	
2009.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2009.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2009.25 MAINTENANCE	12.00	MO	30,500	1,830	3,233	178	35,741	2978.40
2009.30 UTILITIES	12.00	MO	987,584	59,255	104,684	5,758	1,157,280	96440.02
2009.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2009.40 CHEMICALS	12.00	MO	26,098	1,566	2,766	152	30,583	2548.56
2009.45 DISPOSALS	12.00	MO	104,677	6,281	11,096	610	122,664	10221.97
2009.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2009.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
2009.60 TREATMENT SYSTEM CONSTRUCTION			4,430,237	265,814	469,605	25,828	5,191,484	
TOTAL HEAT YR3 STEP 1 & WELLS STEP 2	1.00	JOB	7,760,024	465,601	822,563	45,241	9,093,429	9093428.87
Scope Contingency	9.78	%					889,352	
SUBTOTAL							9,982,781	
Bid Contingency	9.65	%					963,739	
TOTAL INCL OWNER COSTS							10,946,520	
2010 HEAT YR1 STEP 2								
2010. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2010.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2010.12 ENGINEEERING			659,472	39,568	69,904	3,845	772,789	
2010.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2010.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2010.25 MAINTENANCE	12.00	MO	33,200	1,992	3,519	194	38,905	3242.06
2010.30 UTILITIES	12.00	MO	1,470,766	88,246	155,901	8,575	1,723,488	143624.02
2010.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2010.40 CHEMICALS	12.00	MO	32,841	1,970	3,481	191	38,484	3206.96
2010.45 DISPOSALS	12.00	MO	113,479	6,809	12,029	662	132,978	11081.47
2010.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
2010.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
2010.60 DEMOBE/DEMO SPH 6PH COMPONENTS	1.00	JOB	37,452	2,247	3,970	218	43,887	43887.38
TOTAL HEAT YR1 STEP 2	1.00	JOB	3,792,264	227,536	401,980	22,109	4,443,889	4443888.83

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	9.76	%					433,652	
SUBTOTAL							4,877,541	
Bid Contingency	9.38	%					457,677	
TOTAL INCL OWNER COSTS							5,335,217	
2011 HEAT YR 2 STEP 2								
2011. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2011.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2011.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2011.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2011.25 MAINTENANCE	12.00	MO	40,200	2,412	4,261	234	47,108	3925.63
2011.30 UTILITIES	12.00	MO	1,120,619	67,237	118,786	6,533	1,313,175	109431.29
2011.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2011.40 CHEMICALS	12.00	MO	32,340	1,940	3,428	189	37,896	3158.04
2011.45 DISPOSALS	12.00	MO	108,469	6,508	11,498	632	127,107	10592.23
2011.49 SAMPLING & ANALYSIS	12.00	MO	212,415	12,745	22,516	1,238	248,914	20742.85
2011.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
2011.60 TREATMENT SYSTEM CONSTRUCTION			2,186,400	131,184	231,758	12,747	2,562,089	
TOTAL HEAT YR 2 STEP 2	1.00	JOB	4,853,744	291,225	514,497	28,297	5,687,763	5687762.76
Scope Contingency	9.81	%					558,039	
SUBTOTAL							6,245,802	
Bid Contingency	9.60	%					599,616	
TOTAL INCL OWNER COSTS							6,845,418	
2012 HEAT YR 3 STEP 2 & WELLS STEP 3								
2012. 5 GENERAL CONDITIONS	12.00	MO	262,025	15,721	27,775	1,528	307,048	25587.36
2012.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2012.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2012.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2012.25 MAINTENANCE	12.00	MO	40,200	2,412	4,261	234	47,108	3925.63
2012.30 UTILITIES	12.00	MO	1,120,619	67,237	118,786	6,533	1,313,175	109431.29
2012.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2012.40 CHEMICALS	12.00	MO	32,340	1,940	3,428	189	37,896	3158.04
2012.45 DISPOSALS	12.00	MO	108,469	6,508	11,498	632	127,107	10592.23
2012.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2012.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
2012.60 TREATMENT SYSTEM CONSTRUCTION			4,107,661	246,460	435,412	23,948	4,813,480	
2012.65 START UP, TESTING, O&M PLAN	1.00	JOB	427,549	25,653	45,320	2,493	501,015	501014.81
2012.70 DEMOBILIZATION	1.00	JOB	159,306	9,558	16,886	929	186,680	186679.99
TOTAL HEAT YR 3 STEP 2 & WELLS STEP 3	1.00	JOB	7,517,600	451,056	796,866	43,828	8,809,350	8809349.68

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Scope Contingency	9.77	%					860,944	
SUBTOTAL							9,670,294	
Bid Contingency	9.64	%					932,490	
TOTAL INCL OWNER COSTS							10,602,784	
2013 HEAT YR1 STEP 3								
2013. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2013.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2013.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2013.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2013.25 MAINTENANCE	12.00	MO	49,000	2,940	5,194	286	57,420	4784.97
2013.30 UTILITIES	12.00	MO	2,555,664	153,340	270,900	14,900	2,994,803	249566.93
2013.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2013.40 CHEMICALS	12.00	MO	54,270	3,256	5,753	316	63,596	5299.63
2013.45 DISPOSALS	12.00	MO	124,296	7,458	13,175	725	145,654	12137.80
2013.49 SAMPLING & ANALYSIS	12.00	MO	293,953	17,637	31,159	1,714	344,463	28705.24
2013.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR1 STEP 3	1.00	JOB	4,230,484	253,829	448,431	24,664	4,957,408	4957408.32
Scope Contingency	9.78	%					485,004	
SUBTOTAL							5,442,412	
Bid Contingency	9.44	%					514,022	
TOTAL INCL OWNER COSTS							5,956,434	
2014 HEAT YR2 STEP 3								
2014. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2014.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2014.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2014.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2014.25 MAINTENANCE	12.00	MO	49,000	2,940	5,194	286	57,420	4784.97
2014.30 UTILITIES	12.00	MO	1,918,314	115,099	203,341	11,184	2,247,937	187328.11
2014.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2014.40 CHEMICALS	12.00	MO	54,770	3,286	5,806	319	64,182	5348.46
2014.45 DISPOSALS	12.00	MO	119,286	7,157	12,644	695	139,783	11648.56
2014.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2014.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR2 STEP 3	1.00	JOB	3,504,886	210,293	371,518	20,433	4,107,131	4107130.82
Scope Contingency	9.74	%					399,976	
SUBTOTAL							4,507,107	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
Bid Contingency	9.45	%					425,888	
TOTAL INCL OWNER COSTS							4,932,995	
2015 HEAT YR3 STEP 3 & WELLS STEP 4								
2015. 5 GENERAL CONDITIONS	12.00	MO	262,025	15,721	27,775	1,528	307,048	25587.36
2015.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2015.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2015.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2015.25 MAINTENANCE	12.00	MO	49,000	2,940	5,194	286	57,420	4784.97
2015.30 UTILITIES	12.00	MO	1,918,314	115,099	203,341	11,184	2,247,937	187328.11
2015.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2015.40 CHEMICALS	12.00	MO	54,270	3,256	5,753	316	63,596	5299.63
2015.45 DISPOSALS	12.00	MO	119,286	7,157	12,644	695	139,783	11648.56
2015.49 SAMPLING & ANALYSIS	12.00	MO	212,415	12,745	22,516	1,238	248,914	20742.85
2015.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
2015.60 TREATMENT SYSTEM CONSTRUCTION			3,094,763	185,686	328,045	18,042	3,626,536	
TOTAL HEAT YR3 STEP 3 & WELLS STEP 4	1.00	JOB	6,759,289	405,557	716,485	39,407	7,920,738	7920737.79
Scope Contingency	9.75	%					772,083	
SUBTOTAL							8,692,821	
Bid Contingency	9.60	%					834,601	
TOTAL INCL OWNER COSTS							9,527,422	
2016 HEAT YR1 STEP 4								
2016. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2016.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2016.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2016.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2016.25 MAINTENANCE	12.00	MO	57,000	3,420	6,042	332	66,794	5566.19
2016.30 UTILITIES	12.00	MO	2,198,870	131,932	233,080	12,819	2,576,702	214725.15
2016.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2016.40 CHEMICALS	12.00	MO	78,770	4,726	8,350	459	92,305	7692.12
2016.45 DISPOSALS	12.00	MO	136,434	8,186	14,462	795	159,878	13323.16
2016.49 SAMPLING & ANALYSIS	12.00	MO	291,753	17,505	30,926	1,701	341,885	28490.41
2016.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR1 STEP 4	1.00	JOB	3,916,129	234,968	415,110	22,831	4,589,038	4589037.81
Scope Contingency	9.77	%					448,167	
SUBTOTAL							5,037,205	
Bid Contingency	9.40	%					473,643	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							5,510,848	
2017 HEAT YR2 STEP 4								
2017. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2017.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2017.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2017.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2017.25 MAINTENANCE	12.00	MO	57,000	3,420	6,042	332	66,794	5566.19
2017.30 UTILITIES	12.00	MO	1,668,557	100,113	176,867	9,728	1,955,265	162938.76
2017.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2017.40 CHEMICALS	12.00	MO	78,770	4,726	8,350	459	92,305	7692.12
2017.45 DISPOSALS	12.00	MO	131,424	7,885	13,931	766	154,007	12833.93
2017.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2017.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR2 STEP 4	1.00	JOB	3,299,268	197,956	349,722	19,235	3,866,182	3866181.58
Scope Contingency	9.72	%					375,881	
SUBTOTAL							4,242,063	
Bid Contingency	9.41	%					399,384	
TOTAL INCL OWNER COSTS							4,641,447	
2018 HEAT YR3 STEP 4								
2018. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2018.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2018.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2018.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2018.25 MAINTENANCE	12.00	MO	57,000	3,420	6,042	332	66,794	5566.19
2018.30 UTILITIES	12.00	MO	1,668,557	100,113	176,867	9,728	1,955,265	162938.76
2018.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2018.40 CHEMICALS	12.00	MO	78,770	4,726	8,350	459	92,305	7692.12
2018.45 DISPOSALS	12.00	MO	131,424	7,885	13,931	766	154,007	12833.93
2018.49 SAMPLING & ANALYSIS	12.00	MO	210,215	12,613	22,283	1,226	246,336	20528.02
2018.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	23,166	1,390	2,456	135	27,147	2262.22
TOTAL HEAT YR3 STEP 4	1.00	JOB	3,299,268	197,956	349,722	19,235	3,866,182	3866181.58
Scope Contingency	9.72	%					375,881	
SUBTOTAL							4,242,063	
Bid Contingency	9.41	%					399,384	
TOTAL INCL OWNER COSTS							4,641,447	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
2019 COOL DOWN YEAR 1								
2019. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2019.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2019.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2019.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2019.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
2019.30 UTILITIES	12.00	MO	204,927	12,296	21,722	1,195	240,140	20011.65
2019.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2019.40 CHEMICALS	12.00	MO	34,473	2,068	3,654	201	40,396	3366.37
2019.45 DISPOSALS	12.00	MO	159,864	9,592	16,946	932	187,333	15611.12
2019.49 SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
2019.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
2019.60 REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	31,210	1,873	3,308	182	36,573	3047.75
TOTAL COOL DOWN YEAR 1	1.00	JOB	1,852,736	111,164	196,390	10,801	2,171,092	2171091.52
Scope Contingency	9.45	%					205,066	
SUBTOTAL							2,376,157	
Bid Contingency	8.99	%					213,498	
TOTAL INCL OWNER COSTS							2,589,655	
2020 COOL DOWN YEAR 2								
2020. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2020.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2020.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2020.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2020.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
2020.30 UTILITIES	12.00	MO	144,927	8,696	15,362	845	169,830	14152.50
2020.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2020.40 CHEMICALS	12.00	MO	33,973	2,038	3,601	198	39,811	3317.55
2020.45 DISPOSALS	12.00	MO	159,864	9,592	16,946	932	187,333	15611.12
2020.49 SAMPLING & ANALYSIS	12.00	MO	207,790	12,467	22,026	1,211	243,495	20291.21
2020.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL COOL DOWN YEAR 2	1.00	JOB	1,761,026	105,662	186,669	10,267	2,063,623	2063622.82
Scope Contingency	9.51	%					196,147	
SUBTOTAL							2,259,770	
Bid Contingency	8.93	%					201,859	
TOTAL INCL OWNER COSTS							2,461,629	

2021 COOL DOWN YEAR 3

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
2021. 5 GENERAL CONDITIONS	12.00	MO	104,085	6,245	11,033	607	121,970	10164.14
2021.10 SITE FACILITIES	12.00	MO	46,520	2,791	4,931	271	54,514	4542.79
2021.15 HEALTH & SAFETY	12.00	MO	9,480	569	1,005	55	11,109	925.75
2021.20 MATERIALS & SUPPLIES	12.00	MO	3,600	216	382	21	4,219	351.55
2021.25 MAINTENANCE	12.00	MO	70,080	4,205	7,428	409	82,122	6843.49
2021.30 UTILITIES	12.00	MO	144,927	8,696	15,362	845	169,830	14152.50
2021.35 SITE O&M LABOR & MISC EQUIPMENT	12.00	MO	966,451	57,987	102,444	5,634	1,132,516	94376.34
2021.40 CHEMICALS	12.00	MO	31,598	1,896	3,349	184	37,027	3085.62
2021.45 DISPOSALS	12.00	MO	158,858	9,531	16,839	926	186,155	15512.88
2021.49 SAMPLING & ANALYSIS	12.00	MO	278,980	16,739	29,572	1,626	326,917	27243.09
2021.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	14,256	855	1,511	83	16,706	1392.13
TOTAL COOL DOWN YEAR 3	1.00	JOB	1,828,835	109,730	193,856	10,662	2,143,083	2143083.44
Scope Contingency	9.52	%					204,093	
SUBTOTAL							2,347,177	
Bid Contingency	8.78	%					206,012	
TOTAL INCL OWNER COSTS							2,553,189	
2022 O&M MON WELLS & DEMO TREAT SYS.								
2022. 5 GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77
2022.49 SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
2022.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
2022.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	1,366,975	82,019	144,899	7,969	1,601,863	133488.57
TOTAL O&M MON WELLS & DEMO TREAT SYS.	1.00	JOB	1,462,218	87,733	154,995	8,525	1,713,471	1713470.70
Scope Contingency	9.97	%					170,855	
SUBTOTAL							1,884,325	
Bid Contingency	5.00	%					94,216	
TOTAL INCL OWNER COSTS							1,978,542	
2023 TYP. O&M MONITORING WELLS								
2023. 5 GENERAL CONDITIONS	12.00	MO	6,029	362	639	35	7,065	588.77
2023.49 SAMPLING & ANALYSIS	12.00	MO	86,837	5,210	9,205	506	101,758	8479.87
2023.55 QC & ANALYTICAL DATA VALIDATION	12.00	MO	2,376	143	252	14	2,784	232.02
TOTAL TYP. O&M MONITORING WELLS	1.00	JOB	95,242	5,715	10,096	555	111,608	111607.85
Scope Contingency	9.56	%					10,668	
SUBTOTAL							122,276	
Bid Contingency	5.00	%					6,114	

** PROJECT INDIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL INCL OWNER COSTS							128,390	

** PROJECT DIRECT SUMMARY - ACCOUNT **

		QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2003	ENGINEERING & DESIGN	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
2004	ENGINEERING/DESIGN/CONTRACTING	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
2005	CONSTRUCTION STEP 1	1.00	JOB	1,452,084	122,508	1,998,689	2,349,989	237,187	6,160,457	6160456.78
2006	CONSTRUCTION/STARTUP STEP 1	1.00	JOB	1,472,749	44,198	1,165,152	1,569,954	188,795	4,440,848	4440848.18
2007	HEAT YR1 STEP 1	1.00	JOB	1,089,932	64,060	71,668	631,891	1,308,793	3,166,345	3166345.30
2008	HEAT YR2 STEP 1	1.00	JOB	1,089,932	64,060	71,668	285,467	1,001,248	2,512,376	2512375.60
2009	HEAT YR3 STEP 1 & WELLS STEP 2	1.00	JOB	1,942,486	100,070	934,555	3,712,201	1,070,712	7,760,024	7760023.96
2010	HEAT YR1 STEP 2	1.00	JOB	1,093,804	67,420	79,261	1,065,939	1,485,840	3,792,264	3792264.09
2011	HEAT YR 2 STEP 2	1.00	JOB	1,961,121	118,687	1,017,408	486,259	1,270,270	4,853,744	4853743.94
2012	HEAT YR 3 STEP 2 & WELLS STEP 3	1.00	JOB	2,369,026	114,548	1,470,653	2,304,215	1,259,158	7,517,600	7517600.41
2013	HEAT YR1 STEP 3	1.00	JOB	1,093,804	67,420	101,990	396,532	2,570,738	4,230,484	4230484.22
2014	HEAT YR2 STEP 3	1.00	JOB	1,089,932	64,060	101,840	317,076	1,931,978	3,504,886	3504886.22
2015	HEAT YR3 STEP 3 & WELLS STEP 4	1.00	JOB	1,790,349	96,499	661,383	2,208,076	2,002,982	6,759,289	6759289.13
2016	HEAT YR1 STEP 4	1.00	JOB	1,093,804	67,420	128,490	412,470	2,213,944	3,916,129	3916129.31
2017	HEAT YR2 STEP 4	1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31
2018	HEAT YR3 STEP 4	1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31
2019	COOL DOWN YEAR 1	1.00	JOB	1,101,883	64,530	88,473	379,259	218,591	1,852,736	1852735.91
2020	COOL DOWN YEAR 2	1.00	JOB	1,081,022	64,180	87,973	369,259	158,591	1,761,026	1761025.76
2021	COOL DOWN YEAR 3	1.00	JOB	1,084,894	64,180	85,598	434,161	160,001	1,828,835	1828834.76
2022	O&M MON WELLS & DEMO TREAT SYS.	1.00	JOB	403,897	78,339	20,251	910,616	49,115	1,462,218	1462217.82
2023	TYP. O&M MONITORING WELLS	1.00	JOB	42,196	0	2,912	40,910	9,224	95,242	95242.36
TOTAL	McCORMICK&BAXTER SUPERFUND SITE	1.00	EA	24185701	1,390,299	8,344,647	19352703	20547607	73,820,957	73820957.36
	G&A; 6%	6.00	%						4,429,257	
	SUBTOTAL								78,250,215	
	PROFIT; 10%	10.00	%						7,825,021	
	SUBTOTAL								86,075,236	
	BOND; 0.5%	0.50	%						430,376	
	TOTAL INCL INDIRECTS								86,505,612	
	Scope Contingency	9.60	%						8,303,446	
	SUBTOTAL								94,809,059	
	Bid Contingency	9.42	%						8,932,620	
	TOTAL INCL OWNER COSTS								103,741,678	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2003 ENGINEERING & DESIGN									
2003.12 ENGINEERING	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
TOTAL ENGINEERING & DESIGN	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
G&A; 6%	6.00	%						48,238	
SUBTOTAL								852,196	
PROFIT; 10%	10.00	%						85,220	
SUBTOTAL								937,416	
BOND; 0.5%	0.50	%						4,687	
TOTAL INCL INDIRECTS								942,103	
Scope Contingency	10.00	%						94,210	
SUBTOTAL								1,036,313	
Bid Contingency	10.00	%						103,631	
TOTAL INCL OWNER COSTS								1,139,944	
2004 ENGINEERING/DESIGN/CONTRACTING									
2004.12 ENGINEERING	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
TOTAL ENGINEERING/DESIGN/CONTRACTIN	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
G&A; 6%	6.00	%						48,238	
SUBTOTAL								852,196	
PROFIT; 10%	10.00	%						85,220	
SUBTOTAL								937,416	
BOND; 0.5%	0.50	%						4,687	
TOTAL INCL INDIRECTS								942,103	
Scope Contingency	10.00	%						94,210	
SUBTOTAL								1,036,313	
Bid Contingency	10.00	%						103,631	
TOTAL INCL OWNER COSTS								1,139,944	
2005 CONSTRUCTION STEP 1									
2005.05 GENERAL CONDITIONS	1.00	JOB	985,448	67,116	25,898	285,200	184,839	1,548,501	1548500.87
2005.10 SUBMITTALS/IMPLEMENTATION PLA	1.00	JOB	92,897	0	0	805	11,856	105,558	105558.20

** PROJECT DIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.15 MOBE, SITE WORK, TEMP FACILIT	1.00	JOB	180,282	43,114	357,171	156,159	5,638	742,364	742364.33
2005.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	193,457	12,278	1,615,620	1,907,825	34,854	3,764,033	3764033.38
TOTAL CONSTRUCTION STEP 1	1.00	JOB	1,452,084	122,508	1,998,689	2,349,989	237,187	6,160,457	6160456.78
G&A; 6%	6.00	%						369,627	
SUBTOTAL								6,530,084	
PROFIT; 10%	10.00	%						653,008	
SUBTOTAL								7,183,093	
BOND; 0.5%	0.50	%						35,915	
TOTAL INCL INDIRECTS								7,219,008	
Scope Contingency	8.66	%						624,987	
SUBTOTAL								7,843,995	
Bid Contingency	9.92	%						777,905	
TOTAL INCL OWNER COSTS								8,621,901	
2006 CONSTRUCTION/STARTUP STEP 1									
2006.05 GENERAL CONDITIONS	1.00	JOB	486,792	22,150	6,290	73,950	90,787	679,969	679969.10
2006.20 TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	571,092	8,112	1,093,374	1,342,950	0	3,015,528	3015528.04
2006.25 START UP, TESTING, O&M PLAN	1.00	JOB	271,606	13,564	65,462	141,604	93,808	586,045	586044.66
2006.30 DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL CONSTRUCTION/STARTUP STEP 1	1.00	JOB	1,472,749	44,198	1,165,152	1,569,954	188,795	4,440,848	4440848.18
G&A; 6%	6.00	%						266,451	
SUBTOTAL								4,707,299	
PROFIT; 10%	10.00	%						470,730	
SUBTOTAL								5,178,029	
BOND; 0.5%	0.50	%						25,890	
TOTAL INCL INDIRECTS								5,203,919	
Scope Contingency	9.23	%						480,552	
SUBTOTAL								5,684,471	
Bid Contingency	10.00	%						568,447	
TOTAL INCL OWNER COSTS								6,252,918	
2007 HEAT YR1 STEP 1									
2007. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	382,424	1,878	450,509	37542.40

** PROJECT DIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2007.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2007.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2007.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2007.25	MAINTENANCE	12.00	MO	0	0	16,000	14,500	0	30,500	2541.67
2007.30	UTILITIES	12.00	MO	0	0	0	0	1,295,129	1,295,129	107927.45
2007.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2007.40	CHEMICALS	12.00	MO	0	0	24,598	1,500	0	26,098	2174.86
2007.45	DISPOSALS	12.00	MO	0	12,600	100	91,977	0	104,677	8723.09
2007.49	SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2007.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 1		1.00	JOB	1,089,932	64,060	71,668	631,891	1,308,793	3,166,345	3166345.30
G&A; 6%		6.00	%						189,981	
SUBTOTAL									3,356,326	
PROFIT; 10%		10.00	%						335,633	
SUBTOTAL									3,691,959	
BOND; 0.5%		0.50	%						18,460	
TOTAL INCL INDIRECTS									3,710,418	
Scope Contingency		9.16	%						340,007	
SUBTOTAL									4,050,426	
Bid Contingency		8.86	%						358,908	
TOTAL INCL OWNER COSTS									4,409,334	
2008	HEAT YR2 STEP 1									
2008. 5	GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2008.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2008.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2008.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2008.25	MAINTENANCE	12.00	MO	0	0	16,000	14,500	0	30,500	2541.67
2008.30	UTILITIES	12.00	MO	0	0	0	0	987,584	987,584	82298.64
2008.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2008.40	CHEMICALS	12.00	MO	0	0	24,598	1,500	0	26,098	2174.86
2008.45	DISPOSALS	12.00	MO	0	12,600	100	91,977	0	104,677	8723.09
2008.49	SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2008.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 1		1.00	JOB	1,089,932	64,060	71,668	285,467	1,001,248	2,512,376	2512375.60
G&A; 6%		6.00	%						150,743	
SUBTOTAL									2,663,118	
PROFIT; 10%		10.00	%						266,312	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
SUBTOTAL								2,929,430	
BOND; 0.5%	0.50	%						14,647	
TOTAL INCL INDIRECTS								2,944,077	
Scope Contingency	9.64	%						283,671	
SUBTOTAL								3,227,748	
Bid Contingency	9.23	%						297,953	
TOTAL INCL OWNER COSTS								3,525,700	
2009 HEAT YR3 STEP 1 & WELLS STEP 2									
2009. 5 GENERAL CONDITIONS	12.00	MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2009.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2009.12 ENGINEEERING			0	0	0	659,472	0	659,472	
2009.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2009.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2009.25 MAINTENANCE	12.00	MO	0	0	16,000	14,500	0	30,500	2541.67
2009.30 UTILITIES	12.00	MO	0	0	0	0	987,584	987,584	82298.64
2009.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2009.40 CHEMICALS	12.00	MO	0	0	24,598	1,500	0	26,098	2174.86
2009.45 DISPOSALS	12.00	MO	0	12,600	100	91,977	0	104,677	8723.09
2009.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2009.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2009.60 TREATMENT SYSTEM CONSTRUCTION			711,290	32,204	862,886	2,767,262	56,594	4,430,237	
TOTAL HEAT YR3 STEP 1 & WELLS STEP	1.00	JOB	1,942,486	100,070	934,555	3,712,201	1,070,712	7,760,024	7760023.96
G&A; 6%	6.00	%						465,601	
SUBTOTAL								8,225,625	
PROFIT; 10%	10.00	%						822,563	
SUBTOTAL								9,048,188	
BOND; 0.5%	0.50	%						45,241	
TOTAL INCL INDIRECTS								9,093,429	
Scope Contingency	9.78	%						889,352	
SUBTOTAL								9,982,781	
Bid Contingency	9.65	%						963,739	
TOTAL INCL OWNER COSTS								10,946,520	
2010 HEAT YR1 STEP 2									
2010. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73

** PROJECT DIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2010.12	ENGINEEERING			0	0	0	659,472	0	659,472	
2010.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2010.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2010.25	MAINTENANCE	12.00	MO	0	0	17,200	16,000	0	33,200	2766.67
2010.30	UTILITIES	12.00	MO	0	0	0	0	1,470,766	1,470,766	122563.87
2010.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2010.40	CHEMICALS	12.00	MO	0	0	30,841	2,000	0	32,841	2736.71
2010.45	DISPOSALS	12.00	MO	0	15,960	250	97,269	0	113,479	9456.55
2010.49	SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75
2010.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2010.60	DEMOBE/DEMO SPH 6PH COMPONENT	1.00	JOB	0	0	0	37,452	0	37,452	37452.00
TOTAL HEAT YR1 STEP 2		1.00	JOB	1,093,804	67,420	79,261	1,065,939	1,485,840	3,792,264	3792264.09
G&A; 6%		6.00	%						227,536	
SUBTOTAL									4,019,800	
PROFIT; 10%		10.00	%						401,980	
SUBTOTAL									4,421,780	
BOND; 0.5%		0.50	%						22,109	
TOTAL INCL INDIRECTS									4,443,889	
Scope Contingency		9.76	%						433,652	
SUBTOTAL									4,877,541	
Bid Contingency		9.38	%						457,677	
TOTAL INCL OWNER COSTS									5,335,217	
2011 HEAT YR 2 STEP 2										
2011. 5	GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2011.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2011.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2011.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2011.25	MAINTENANCE	12.00	MO	0	0	17,200	23,000	0	40,200	3350.00
2011.30	UTILITIES	12.00	MO	0	0	0	0	1,120,619	1,120,619	93384.95
2011.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2011.40	CHEMICALS	12.00	MO	0	0	30,840	1,500	0	32,340	2694.96
2011.45	DISPOSALS	12.00	MO	0	12,600	100	95,769	0	108,469	9039.05
2011.49	SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	118,010	8,906	212,415	17701.25
2011.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2011.60	TREATMENT SYSTEM CONSTRUCTION			871,189	54,627	938,298	186,300	135,986	2,186,400	
TOTAL HEAT YR 2 STEP 2		1.00	JOB	1,961,121	118,687	1,017,408	486,259	1,270,270	4,853,744	4853743.94
G&A; 6%		6.00	%						291,225	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
SUBTOTAL								5,144,969	
PROFIT; 10%	10.00	%						514,497	
SUBTOTAL								5,659,465	
BOND; 0.5%	0.50	%						28,297	
TOTAL INCL INDIRECTS								5,687,763	
Scope Contingency	9.81	%						558,039	
SUBTOTAL								6,245,802	
Bid Contingency	9.60	%						599,616	
TOTAL INCL OWNER COSTS								6,845,418	
2012 HEAT YR 3 STEP 2 & WELLS STEP 3									
2012. 5 GENERAL CONDITIONS	12.00	MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2012.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2012.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2012.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2012.25 MAINTENANCE	12.00	MO	0	0	17,200	23,000	0	40,200	3350.00
2012.30 UTILITIES	12.00	MO	0	0	0	0	1,120,619	1,120,619	93384.95
2012.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2012.40 CHEMICALS	12.00	MO	0	0	30,840	1,500	0	32,340	2694.96
2012.45 DISPOSALS	12.00	MO	0	12,600	100	95,769	0	108,469	9039.05
2012.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2012.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2012.60 TREATMENT SYSTEM CONSTRUCTION			808,552	32,746	1,326,056	1,880,798	59,509	4,107,661	
2012.65 START UP, TESTING, O&M PLAN	1.00	JOB	186,018	13,564	65,462	114,209	48,295	427,549	427549.06
2012.70 DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL HEAT YR 3 STEP 2 & WELLS STEP	1.00	JOB	2,369,026	114,548	1,470,653	2,304,215	1,259,158	7,517,600	7517600.41
G&A; 6%	6.00	%						451,056	
SUBTOTAL								7,968,656	
PROFIT; 10%	10.00	%						796,866	
SUBTOTAL								8,765,522	
BOND; 0.5%	0.50	%						43,828	
TOTAL INCL INDIRECTS								8,809,350	
Scope Contingency	9.77	%						860,944	
SUBTOTAL								9,670,294	
Bid Contingency	9.64	%						932,490	
TOTAL INCL OWNER COSTS								10,602,784	

** PROJECT DIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2013 HEAT YR1 STEP 3									
2013. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2013.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2013.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2013.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2013.25 MAINTENANCE	12.00	MO	0	0	19,000	30,000	0	49,000	4083.33
2013.30 UTILITIES	12.00	MO	0	0	0	0	2,555,664	2,555,664	212971.96
2013.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2013.40 CHEMICALS	12.00	MO	0	0	51,770	2,500	0	54,270	4522.53
2013.45 DISPOSALS	12.00	MO	0	15,960	250	108,086	0	124,296	10357.99
2013.49 SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	194,266	10,316	293,953	24496.08
2013.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 3	1.00	JOB	1,093,804	67,420	101,990	396,532	2,570,738	4,230,484	4230484.22
G&A; 6%	6.00	%						253,829	
SUBTOTAL								4,484,313	
PROFIT; 10%	10.00	%						448,431	
SUBTOTAL								4,932,745	
BOND; 0.5%	0.50	%						24,664	
TOTAL INCL INDIRECTS								4,957,408	
Scope Contingency	9.78	%						485,004	
SUBTOTAL								5,442,412	
Bid Contingency	9.44	%						514,022	
TOTAL INCL OWNER COSTS								5,956,434	
2014 HEAT YR2 STEP 3									
2014. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2014.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2014.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2014.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2014.25 MAINTENANCE	12.00	MO	0	0	19,000	30,000	0	49,000	4083.33
2014.30 UTILITIES	12.00	MO	0	0	0	0	1,918,314	1,918,314	159859.46
2014.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2014.40 CHEMICALS	12.00	MO	0	0	51,770	3,000	0	54,770	4564.19
2014.45 DISPOSALS	12.00	MO	0	12,600	100	106,586	0	119,286	9940.49
2014.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2014.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 3	1.00	JOB	1,089,932	64,060	101,840	317,076	1,931,978	3,504,886	3504886.22
G&A; 6%	6.00	%						210,293	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
SUBTOTAL								3,715,179	
PROFIT; 10%	10.00	%						371,518	
SUBTOTAL								4,086,697	
BOND; 0.5%	0.50	%						20,433	
TOTAL INCL INDIRECTS								4,107,131	
Scope Contingency	9.74	%						399,976	
SUBTOTAL								4,507,107	
Bid Contingency	9.45	%						425,888	
TOTAL INCL OWNER COSTS								4,932,995	
2015 HEAT YR3 STEP 3 & WELLS STEP 4									
2015. 5 GENERAL CONDITIONS	12.00	MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2015.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2015.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2015.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2015.25 MAINTENANCE	12.00	MO	0	0	19,000	30,000	0	49,000	4083.33
2015.30 UTILITIES	12.00	MO	0	0	0	0	1,918,314	1,918,314	159859.46
2015.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2015.40 CHEMICALS	12.00	MO	0	0	51,770	2,500	0	54,270	4522.53
2015.45 DISPOSALS	12.00	MO	0	12,600	100	106,586	0	119,286	9940.49
2015.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	118,010	8,906	212,415	17701.25
2015.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2015.60 TREATMENT SYSTEM CONSTRUCTION			559,153	28,633	559,543	1,889,300	58,134	3,094,763	
TOTAL HEAT YR3 STEP 3 & WELLS STEP	1.00	JOB	1,790,349	96,499	661,383	2,208,076	2,002,982	6,759,289	6759289.13
G&A; 6%	6.00	%						405,557	
SUBTOTAL								7,164,846	
PROFIT; 10%	10.00	%						716,485	
SUBTOTAL								7,881,331	
BOND; 0.5%	0.50	%						39,407	
TOTAL INCL INDIRECTS								7,920,738	
Scope Contingency	9.75	%						772,083	
SUBTOTAL								8,692,821	
Bid Contingency	9.60	%						834,601	
TOTAL INCL OWNER COSTS								9,527,422	
2016 HEAT YR1 STEP 4									

** PROJECT DIRECT SUMMARY - SYSTEM **

		QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2016. 5	GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2016.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2016.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2016.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2016.25	MAINTENANCE	12.00	MO	0	0	22,000	35,000	0	57,000	4750.00
2016.30	UTILITIES	12.00	MO	0	0	0	0	2,198,870	2,198,870	183239.17
2016.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2016.40	CHEMICALS	12.00	MO	0	0	75,270	3,500	0	78,770	6564.19
2016.45	DISPOSALS	12.00	MO	0	15,960	250	120,224	0	136,434	11369.54
2016.49	SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75
2016.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 4		1.00	JOB	1,093,804	67,420	128,490	412,470	2,213,944	3,916,129	3916129.31
G&A; 6%		6.00	%						234,968	
SUBTOTAL									4,151,097	
PROFIT; 10%		10.00	%						415,110	
SUBTOTAL									4,566,207	
BOND; 0.5%		0.50	%						22,831	
TOTAL INCL INDIRECTS									4,589,038	
Scope Contingency		9.77	%						448,167	
SUBTOTAL									5,037,205	
Bid Contingency		9.40	%						473,643	
TOTAL INCL OWNER COSTS									5,510,848	
2017 HEAT YR2 STEP 4										
2017. 5	GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2017.10	SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2017.15	HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2017.20	MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2017.25	MAINTENANCE	12.00	MO	0	0	22,000	35,000	0	57,000	4750.00
2017.30	UTILITIES	12.00	MO	0	0	0	0	1,668,557	1,668,557	139046.42
2017.35	SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2017.40	CHEMICALS	12.00	MO	0	0	75,270	3,500	0	78,770	6564.19
2017.45	DISPOSALS	12.00	MO	0	12,600	100	118,724	0	131,424	10952.04
2017.49	SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2017.55	QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 4		1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31
G&A; 6%		6.00	%						197,956	
SUBTOTAL									3,497,224	
PROFIT; 10%		10.00	%						349,722	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
SUBTOTAL								3,846,947	
BOND; 0.5%	0.50	%						19,235	
TOTAL INCL INDIRECTS								3,866,182	
Scope Contingency	9.72	%						375,881	
SUBTOTAL								4,242,063	
Bid Contingency	9.41	%						399,384	
TOTAL INCL OWNER COSTS								4,641,447	
2018 HEAT YR3 STEP 4									
2018. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2018.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2018.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2018.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2018.25 MAINTENANCE	12.00	MO	0	0	22,000	35,000	0	57,000	4750.00
2018.30 UTILITIES	12.00	MO	0	0	0	0	1,668,557	1,668,557	139046.42
2018.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2018.40 CHEMICALS	12.00	MO	0	0	75,270	3,500	0	78,770	6564.19
2018.45 DISPOSALS	12.00	MO	0	12,600	100	118,724	0	131,424	10952.04
2018.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2018.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR3 STEP 4	1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31
G&A; 6%	6.00	%						197,956	
SUBTOTAL								3,497,224	
PROFIT; 10%	10.00	%						349,722	
SUBTOTAL								3,846,947	
BOND; 0.5%	0.50	%						19,235	
TOTAL INCL INDIRECTS								3,866,182	
Scope Contingency	9.72	%						375,881	
SUBTOTAL								4,242,063	
Bid Contingency	9.41	%						399,384	
TOTAL INCL OWNER COSTS								4,641,447	
2019 COOL DOWN YEAR 1									
2019. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2019.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2019.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00

** PROJECT DIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2019.25 MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00
2019.30 UTILITIES	12.00	MO	0	0	0	0	204,927	204,927	17077.27
2019.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2019.40 CHEMICALS	12.00	MO	0	0	31,973	2,500	0	34,473	2872.75
2019.45 DISPOSALS	12.00	MO	0	12,720	200	146,944	0	159,864	13322.00
2019.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83
2019.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
2019.60 REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	20,860	350	0	10,000	0	31,210	2600.85
TOTAL COOL DOWN YEAR 1	1.00	JOB	1,101,883	64,530	88,473	379,259	218,591	1,852,736	1852735.91
G&A; 6%	6.00	%						111,164	
SUBTOTAL								1,963,900	
PROFIT; 10%	10.00	%						196,390	
SUBTOTAL								2,160,290	
BOND; 0.5%	0.50	%						10,801	
TOTAL INCL INDIRECTS								2,171,092	
Scope Contingency	9.45	%						205,066	
SUBTOTAL								2,376,157	
Bid Contingency	8.99	%						213,498	
TOTAL INCL OWNER COSTS								2,589,655	
2020 COOL DOWN YEAR 2									
2020. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2020.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2020.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2020.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2020.25 MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00
2020.30 UTILITIES	12.00	MO	0	0	0	0	144,927	144,927	12077.27
2020.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2020.40 CHEMICALS	12.00	MO	0	0	31,473	2,500	0	33,973	2831.08
2020.45 DISPOSALS	12.00	MO	0	12,720	200	146,944	0	159,864	13322.00
2020.49 SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83
2020.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL COOL DOWN YEAR 2	1.00	JOB	1,081,022	64,180	87,973	369,259	158,591	1,761,026	1761025.76
G&A; 6%	6.00	%						105,662	
SUBTOTAL								1,866,687	
PROFIT; 10%	10.00	%						186,669	
SUBTOTAL								2,053,356	

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
BOND; 0.5%	0.50	%						10,267	
TOTAL INCL INDIRECTS								2,063,623	
Scope Contingency	9.51	%						196,147	
SUBTOTAL								2,259,770	
Bid Contingency	8.93	%						201,859	
TOTAL INCL OWNER COSTS								2,461,629	
2021 COOL DOWN YEAR 3									
2021. 5 GENERAL CONDITIONS	12.00	MO	66,207	0	0	36,000	1,878	104,085	8673.73
2021.10 SITE FACILITIES	12.00	MO	0	17,460	500	25,680	2,880	46,520	3876.67
2021.15 HEALTH & SAFETY	12.00	MO	0	9,000	480	0	0	9,480	790.00
2021.20 MATERIALS & SUPPLIES	12.00	MO	0	0	3,600	0	0	3,600	300.00
2021.25 MAINTENANCE	12.00	MO	0	0	30,080	40,000	0	70,080	5840.00
2021.30 UTILITIES	12.00	MO	0	0	0	0	144,927	144,927	12077.27
2021.35 SITE O&M LABOR & MISC EQUIPME	12.00	MO	966,451	0	0	0	0	966,451	80537.57
2021.40 CHEMICALS	12.00	MO	0	0	29,098	2,500	0	31,598	2633.17
2021.45 DISPOSALS	12.00	MO	0	12,720	200	145,938	0	158,858	13238.17
2021.49 SAMPLING & ANALYSIS	12.00	MO	37,981	25,000	21,640	184,043	10,316	278,980	23248.33
2021.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL COOL DOWN YEAR 3	1.00	JOB	1,084,894	64,180	85,598	434,161	160,001	1,828,835	1828834.76
G&A; 6%	6.00	%						109,730	
SUBTOTAL								1,938,565	
PROFIT; 10%	10.00	%						193,856	
SUBTOTAL								2,132,421	
BOND; 0.5%	0.50	%						10,662	
TOTAL INCL INDIRECTS								2,143,083	
Scope Contingency	9.52	%						204,093	
SUBTOTAL								2,347,177	
Bid Contingency	8.78	%						206,012	
TOTAL INCL OWNER COSTS								2,553,189	
2022 O&M MON WELLS & DEMO TREAT SYS.									
2022. 5 GENERAL CONDITIONS	12.00	MO	5,711	0	0	0	318	6,029	502.43
2022.49 SAMPLING & ANALYSIS	12.00	MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
2022.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
2022.60 DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	361,701	78,339	17,338	869,706	39,891	1,366,975	113914.62

** PROJECT DIRECT SUMMARY - SYSTEM **

	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL O&M MON WELLS & DEMO TREAT SY	1.00	JOB	403,897	78,339	20,251	910,616	49,115	1,462,218	1462217.82
G&A; 6%	6.00	%						87,733	
SUBTOTAL								1,549,951	
PROFIT; 10%	10.00	%						154,995	
SUBTOTAL								1,704,946	
BOND; 0.5%	0.50	%						8,525	
TOTAL INCL INDIRECTS								1,713,471	
Scope Contingency	9.97	%						170,855	
SUBTOTAL								1,884,325	
Bid Contingency	5.00	%						94,216	
TOTAL INCL OWNER COSTS								1,978,542	
2023 TYP. O&M MONITORING WELLS									
2023. 5 GENERAL CONDITIONS	12.00	MO	5,711	0	0	0	318	6,029	502.43
2023.49 SAMPLING & ANALYSIS	12.00	MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
2023.55 QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL TYP. O&M MONITORING WELLS	1.00	JOB	42,196	0	2,912	40,910	9,224	95,242	95242.36
G&A; 6%	6.00	%						5,715	
SUBTOTAL								100,957	
PROFIT; 10%	10.00	%						10,096	
SUBTOTAL								111,053	
BOND; 0.5%	0.50	%						555	
TOTAL INCL INDIRECTS								111,608	
Scope Contingency	9.56	%						10,668	
SUBTOTAL								122,276	
Bid Contingency	5.00	%						6,114	
TOTAL INCL OWNER COSTS								128,390	

** CONTRACTOR INDIRECT SUMMARY **

	DIRECT	G&A	PROFIT	BOND	TOTAL COST	UNIT COST
AA Prime Contractor						
PL Mechanical Subcontractor	3,038,925	455,839	349,476	57,664	3,901,904	3901903.60
PV Paving Subcontractor	81,164	12,175	9,334	1,540	104,213	104212.93
EL Electrical Contractor	183,317	27,498	21,081	3,478	235,374	235374.09
Subtotal Subcontract Work	3,303,406	495,511	379,892	62,682	4,241,491	4241490.62
Indirect on Subcontracts	4,241,491	254,489	449,598	24,728	4,970,306	4970305.95
Indirect on Own Work	69,579,467	4,174,768	7,375,423	405,648	81,535,307	81535306.52
AA Prime Contractor	73,820,957	4,429,257	7,825,021	430,376	86,505,612	86505612.47

2003.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2003. ENGINEERING & DESIGN								
2003.12. ENGINEERING								
2003.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, steam, and gas lines, drainage, roads and parking.								
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	100.00 HR	7,920	0	0	0	0	7,920	79.20
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	600.00 HR	25,080	0	0	0	0	25,080	41.80
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	400.00 HR	13,200	0	0	0	0	13,200	33.00
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	500.00 EA	0	0	0	1,500	0	1,500	3.00
TOTAL COMPLETION DESIGN - CIVIL	1.00 JOB	85,580	0	0	1,500	5,000	92,080	92080.00
2003.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	500.00 HR	51,700	0	0	0	0	51,700	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	1000.00 HR	41,800	0	0	0	0	41,800	41.80

2003.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	1000.00 HR	84,700	0	0	0	0	84,700	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	500.00 HR	24,200	0	0	0	0	24,200	48.40
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00 EA	0	0	0	3,000	0	3,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00 JOB	202,400	0	0	3,000	10,000	215,400	215400.00

2003.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II; Electrical Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	200.00 HR	14,520	0	0	0	0	14,520	72.60
USR AA Principal Engineer/Scientist I; Electrical Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	100.00 HR	9,130	0	0	0	0	9,130	91.30
USR AA Senior Engineer/Scientist II; Instrument Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	50.00 HR	3,630	0	0	0	0	3,630	72.60
USR AA Senior Engineer/Scientist I; Electrical Engineer		67.10	0.00	0.00	0.00	0.00	67.10	
	250.00 HR	16,775	0	0	0	0	16,775	67.10
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00 JOB	44,055	0	0	0	5,000	49,055	49055.00

2003.12.26. PCS PROGRAMMING - GROUNDWATER

2003.12.26.15. PC PROGRAMMING
Process Control programming of PLC/PCS.

USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	25.00 HR	2,283	0	0	0	0	2,283	91.30

2003.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	100.00	HR	6,710	0	0	0	0	6,710	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA ODC's			0.00	0.00	0.00	0.00	250.00	250.00	
	1.00	LS	0	0	0	0	250	250	250.00
TOTAL PC PROGRAMMING	1.00	JOB	9,147	0	0	0	250	9,397	9396.50
2003.12.26.20. MMI PROGRAMMING Program man-machine interface, control panels, displays.									
USR AA Principal Engineer/Scientist I			91.30	0.00	0.00	0.00	0.00	91.30	
	10.00	HR	913	0	0	0	0	913	91.30
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	70.00	HR	4,697	0	0	0	0	4,697	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	2.00	HR	77	0	0	0	0	77	38.50
USR AA ODC's			0.00	0.00	0.00	0.00	250.00	250.00	
	1.00	LS	0	0	0	0	250	250	250.00
TOTAL MMI PROGRAMMING	1.00	JOB	5,687	0	0	0	250	5,937	5937.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00	JOB	14,834	0	0	0	500	15,334	15333.50
2003.12.32. COMPLETION DESIGN - MECHANICAL Design piping to and from all process equipment, wells, tanks, and instrument requirements, HVAC, building plumbing.									
USR AA Principal Engineer/Scientist III			103.40	0.00	0.00	0.00	0.00	103.40	
	50.00	HR	5,170	0	0	0	0	5,170	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	150.00	HR	6,270	0	0	0	0	6,270	41.80
USR AA ODC's			0.00	0.00	0.00	0.00	2500.00	2500.00	
	1.00	LS	0	0	0	0	2,500	2,500	2500.00
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	100.00	HR	8,470	0	0	0	0	8,470	84.70

2003.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	200.00	HR	9,680	0	0	0	0	9,680	48.40
TOTAL COMPLETION DESIGN - MECHANICA	1.00	JOB	29,590	0	0	0	2,500	32,090	32090.00

2003.12.37. COMPLETE DESIGN - SPECIALTY SUB
Specialty sub for steam and electrical resistance heating remediation systems including instrumentation, thermodynamics, estimates of waste removal and rate of heating, cooling, and waste removal rates. Systems may include steam injection, electrical resistance heating and related instrumentation and controls.

USR AA Completion Design from			0.00	0.00	0.00	400000.00	0.00	400000.00	
Conceptual to Bid Package	1.00	JOB	0	0	0	400,000	0	400,000	400000.00
TOTAL COMPLETE DESIGN - SPECIALTY S	1.00	JOB	0	0	0	400,000	0	400,000	400000.00
TOTAL ENGINEERING	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
TOTAL ENGINEERING & DESIGN	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50

2004.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2004. ENGINEERING/DESIGN/CONTRACTING								
2004.12. ENGINEERING								
2004.12.10. COMPLETION DESIGN - CIVIL Civil design requirements include: Building structure, Concrete Site work; fence, paving, misc conc. Flowlines, discharge line; location, specs., leak detection, routing, caps (soil and asphalt), specifications, sewer, water, steam, and gas lines, drainage, roads and parking.								
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	100.00 HR	7,920	0	0	0	0	7,920	79.20
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	400.00 HR	29,040	0	0	0	0	29,040	72.60
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	600.00 HR	25,080	0	0	0	0	25,080	41.80
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	400.00 HR	13,200	0	0	0	0	13,200	33.00
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	500.00 EA	0	0	0	1,500	0	1,500	3.00
TOTAL COMPLETION DESIGN - CIVIL	1.00 JOB	85,580	0	0	1,500	5,000	92,080	92080.00
2004.12.15. COMPLETION DESIGN - PROCESS Process design requirements: Wastewater treatment, equipment sizing, selections, characterization and testing, piping, mechanical, drafting, specifications.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	500.00 HR	51,700	0	0	0	0	51,700	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	1000.00 HR	41,800	0	0	0	0	41,800	41.80

2004.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	1000.00 HR	84,700	0	0	0	0	84,700	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	500.00 HR	24,200	0	0	0	0	24,200	48.40
USR AA ODC's		0.00	0.00	0.00	0.00	10000.00	10000.00	
	1.00 LS	0	0	0	0	10,000	10,000	10000.00
USR AA Blueprints		0.00	0.00	0.00	3.00	0.00	3.00	
	1000.00 EA	0	0	0	3,000	0	3,000	3.00
TOTAL COMPLETION DESIGN - PROCESS	1.00 JOB	202,400	0	0	3,000	10,000	215,400	215400.00

2004.12.20. COMPLETION DESIGN - ELECTRICAL
Electrical Design requirements: Electrical service, power controls, MCC, lighting, service to all motors, instruments, electrodes, drawings, and specifications.

USR AA Senior Engineer/Scientist II; Electrical Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	200.00 HR	14,520	0	0	0	0	14,520	72.60
USR AA Principal Engineer/Scientist I; Electrical Engineer		91.30	0.00	0.00	0.00	0.00	91.30	
	100.00 HR	9,130	0	0	0	0	9,130	91.30
USR AA Senior Engineer/Scientist II; Instrument Designer		72.60	0.00	0.00	0.00	0.00	72.60	
	50.00 HR	3,630	0	0	0	0	3,630	72.60
USR AA Senior Engineer/Scientist I; Electrical Engineer		67.10	0.00	0.00	0.00	0.00	67.10	
	250.00 HR	16,775	0	0	0	0	16,775	67.10
USR AA ODC's		0.00	0.00	0.00	0.00	5000.00	5000.00	
	1.00 LS	0	0	0	0	5,000	5,000	5000.00
TOTAL COMPLETION DESIGN - ELECTRICA	1.00 JOB	44,055	0	0	0	5,000	49,055	49055.00

2004.12.26. PCS PROGRAMMING - GROUNDWATER

2004.12.26.15. PC PROGRAMMING
Process Control programming of PLC/PCS.

USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	25.00 HR	2,283	0	0	0	0	2,283	91.30

2004.12. ENGINEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	100.00 HR	6,710	0	0	0	0	6,710	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	250.00	250.00	
	1.00 LS	0	0	0	0	250	250	250.00
TOTAL PC PROGRAMMING	1.00 JOB	9,147	0	0	0	250	9,397	9396.50
2004.12.26.20. MMI PROGRAMMING Program man-machine interface, control panels, displays.								
USR AA Principal Engineer/Scientist I		91.30	0.00	0.00	0.00	0.00	91.30	
	10.00 HR	913	0	0	0	0	913	91.30
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	70.00 HR	4,697	0	0	0	0	4,697	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	2.00 HR	77	0	0	0	0	77	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	250.00	250.00	
	1.00 LS	0	0	0	0	250	250	250.00
TOTAL MMI PROGRAMMING	1.00 JOB	5,687	0	0	0	250	5,937	5937.00
TOTAL PCS PROGRAMMING - GROUNDWATER	1.00 JOB	14,834	0	0	0	500	15,334	15333.50
2004.12.32. COMPLETION DESIGN - MECHANICAL Design piping to and from all process equipment, wells, tanks, and instrument requirements, HVAC, building plumbing.								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	50.00 HR	5,170	0	0	0	0	5,170	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	150.00 HR	6,270	0	0	0	0	6,270	41.80
USR AA ODC's		0.00	0.00	0.00	0.00	2500.00	2500.00	
	1.00 LS	0	0	0	0	2,500	2,500	2500.00
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	100.00 HR	8,470	0	0	0	0	8,470	84.70

2004.12. ENGINEERING	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	200.00	HR	9,680	0	0	0	0	9,680	48.40
TOTAL COMPLETION DESIGN - MECHANICA	1.00	JOB	29,590	0	0	0	2,500	32,090	32090.00

2004.12.37. COMPLETE DESIGN - SPECIALTY SUB

Specialty sub for steam and electrical resistance heating remediation systems including instrumentation, thermodynamics, estimates of waste removal and rate of heating, cooling, and waste removal rates. Systems may include steam injection, electrical resistance heating and related instrumentation and controls.

USR AA Completion Design from			0.00	0.00	0.00	400000.00	0.00	400000.00	
Conceptual to Bid Package	1.00	JOB	0	0	0	400,000	0	400,000	400000.00
TOTAL COMPLETE DESIGN - SPECIALTY S	1.00	JOB	0	0	0	400,000	0	400,000	400000.00
TOTAL ENGINEERING	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50
TOTAL ENGINEERING/DESIGN/CONTRACTIN	1.00	JOB	376,459	0	0	404,500	23,000	803,959	803958.50

2005.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005. CONSTRUCTION STEP 1								
2005.05. GENERAL CONDITIONS								
2005.05.01. FIELD SUPERVISION & MANAGEMENT Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	2000.00 HR	133,630	0	0	0	0	133,630	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	2000.00 HR	86,940	0	0	0	0	86,940	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	2000.00 HR	106,260	0	0	0	0	106,260	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	2000.00 HR	38,640	0	0	0	0	38,640	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	2000.00 HR	74,060	0	0	0	0	74,060	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	2000.00 HR	86,940	0	0	0	0	86,940	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	2000.00 HR	102,377	0	0	0	0	102,377	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	2000.00 HR	0	11,000	0	0	0	11,000	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	36.00 MO	0	0	0	0	36,000	36,000	1000.00
for 12 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	1647.00 DAY	0	0	0	0	46,940	46,940	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	80.00 EA	0	0	0	0	40,000	40,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	80.00 EA	0	0	0	0	1,600	1,600	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	40000 MI	0	0	0	0	14,000	14,000	0.35

2005.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	628,847	11,000	0	0	138,540	778,387	778386.50
2005.05.02. ADMINISTRATION HOME OFFICE Scheduler, also serves in cost control. Average 20 hrs/wk.								
USR AA Program Manager.		103.40	0.00	0.00	0.00	0.00	103.40	
	348.00 HR	35,983	0	0	0	0	35,983	103.40
USR AA Prin. Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	400.00 HR	36,520	0	0	0	0	36,520	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	838.00 HR	32,263	0	0	0	0	32,263	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	1608.00 HR	95,515	0	0	0	0	95,515	59.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	209.00 HR	21,611	0	0	0	0	21,611	103.40
Health and Safety Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	209.00 HR	21,611	0	0	0	0	21,611	103.40
gr								
USR AA Mileage on Personal Car Pjm		0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 52 wks	20800 MI	0	0	0	0	6,448	6,448	0.31
*								
USR AA Lodging; 1.5 mo for PjM plus		0.00	0.00	0.00	0.00	80.00	80.00	
additional visits during	100.00 DAY	0	0	0	0	8,000	8,000	80.00
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	100.00 DAY	0	0	0	0	3,800	3,800	38.00
USR AA Airfare Trips for HSM, QCSyst		0.00	0.00	0.00	0.00	500.00	500.00	
ems	6.00 EA	0	0	0	0	3,000	3,000	500.00
Mngr,								
USR AA Rental Car HSM visits (4) and		0.00	0.00	0.00	0.00	45.00	45.00	
2	6.00 DAY	0	0	0	0	270	270	45.00
visits by QC Systems Mgr.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	12.00 EA	0	0	0	0	240	240	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00 JOB	243,503	0	0	0	21,758	265,261	265260.60

2005.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.05.03. PURCHASING									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	1200.00	HR	87,120	0	0	0	0	87,120	72.60
USR AA Secretary/Clerical IV Home			38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	125.00	HR	4,813	0	0	0	0	4,813	38.50
TOTAL PURCHASING	1.00	JOB	91,933	0	0	0	0	91,933	91932.50
2005.05.06. FIRST AID, FIRE, TRAFFIC, SECUR									
USR AA Security Guard Service 24 hr/			0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00	HR	0	0	0	131,400	0	131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S			56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00	EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower			145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No	1.00	EA	145	1	123	0	0	269	269.19
Additional Copper Piping Etc.									
HTW AA Eye Wash Bowl			126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No	4.00	EA	508	4	661	0	0	1,173	293.21
Additional Copper Piping Etc.									
HTW AA First Aid Kit			0.00	0.00	75.00	0.00	0.00	75.00	
	16.00	EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher			0.00	0.00	150.00	0.00	0.00	150.00	
	2.00	EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00	JOB	1,773	15	3,458	131,400	0	136,647	136646.78
2005.05.07. HEALTH & SAFETY									
USR AA Decon Misc Items			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
USR AA Level C PPE			0.00	0.00	41.00	0.00	0.00	41.00	
	40.00	DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE			0.00	0.00	12.00	0.00	0.00	12.00	
	100.00	DAY	0	0	1,200	0	0	1,200	12.00
USR AA Install/Decon Personnel Decon			192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00	LS	192	1	250	0	0	443	443.30

2005.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	12.00 MO	0	4,200	0	0	0	4,200	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	12.00 MO	0	5,100	0	0	0	5,100	425.00
USR AA Labor Allowance for Site		120.00	0.00	0.00	0.00	0.00	120.00	
Specific Training	60.00 EA	7,200	0	0	0	0	7,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	60.00 EA	12,000	0	0	0	0	12,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	60.00 EA	0	0	0	21,000	0	21,000	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	19,392	18,901	4,140	21,000	0	63,433	63433.30
2005.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	12.00 MO	0	0	0	0	900	900	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	12.00 MO	0	0	0	0	2,400	2,400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	12.00 MO	0	0	0	0	2,400	2,400	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	24.00 MO	0	0	0	0	2,040	2,040	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	12.00 MO	0	0	4,800	0	0	4,800	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	12.00 MO	0	0	0	2,400	0	2,400	200.00

2005.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	12.00 MO	0	7,200	0	0	0	7,200	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	12.00 MO	0	6,000	0	0	0	6,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 MO	0	0	0	0	600	600	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	6.00 EA	0	18,000	0	0	0	18,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	3.00 EA	0	0	0	1,800	0	1,800	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	12.00 MO	0	0	0	2,400	0	2,400	200.00
USR AA COE Software, Primavera Suretrack		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 EA	0	0	500	0	0	500	500.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 EA	0	0	0	10,000	0	10,000	10000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 EA	0	0	0	5,000	0	5,000	5000.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	2.00 EA	0	0	0	10,000	0	10,000	5000.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	37,200	18,300	31,600	13,140	100,240	100240.00

2005.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	12.00 MO	0	0	0	0	6,000	6,000	500.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	12.00 MO	0	0	0	0	5,400	5,400	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	12.00 MO	0	0	0	1,200	1	1,201	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	1,200	11,401	12,601	12601.20
2005.05.15. PATENT FEES								
USR AA Patent Fee Allowance		0.00	0.00	0.00	100000.00	0.00	100000.00	
	1.00 LS	0	0	0	100,000	0	100,000	100000.00
TOTAL PATENT FEES		0	0	0	100,000	0	100,000	
TOTAL GENERAL CONDITIONS	1.00 JOB	985,448	67,116	25,898	285,200	184,839	1,548,501	1548500.87
2005.10. SUBMITTALS/IMPLEMENTATION PLANS								
2005.10.01. Construction Work Plan								
USR AA Principal Engineer/Scientist III		103.40	0.00	0.00	0.00	0.00	103.40	
	2.00 HR	207	0	0	0	0	207	103.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	24.00 HR	924	0	0	0	0	924	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	60.00 HR	5,082	0	0	0	0	5,082	84.70
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Senior Engineer/Scientist IV; Response to Comments		84.70	0.00	0.00	0.00	0.00	84.70	
	24.00 HR	2,033	0	0	0	0	2,033	84.70
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00

2005.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Construction Work Plan	1.00	EA	10,930	0	0	100	1,200	12,230	12229.60
2005.10.02. Contractors QC Management Plan									
USR AA Principal Engineer/Scientist III; Contractors CQC System Mana			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	48.00	HR	2,851	0	0	0	0	2,851	59.40
USR AA Engineer/Scientist IV; Response to Comments			59.40	0.00	0.00	0.00	0.00	59.40	
	20.00	HR	1,188	0	0	0	0	1,188	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors QC Management Pla	1.00	EA	6,002	0	0	100	1,200	7,302	7301.60
2005.10.03. Contractors Chem Quality Control Includes Contractors CQCMP, SAP, FSP, QAPP, Groundwater SAP, Process Liquid SAP.									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	16.00	HR	616	0	0	0	0	616	38.50
USR AA Senior Engineer/Scientist II; Project Chemist			72.60	0.00	0.00	0.00	0.00	72.60	
	100.00	HR	7,260	0	0	0	0	7,260	72.60
USR AA Senior Engineer/Scientist II; Project Chemist; Response to comments.			72.60	0.00	0.00	0.00	0.00	72.60	
	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	20.00	HR	1,694	0	0	0	0	1,694	84.70
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00

2005.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Contractors Chem Quality Cont	1.00 EA	12,474	0	0	100	1,200	13,774	13774.00

2005.10.05. Regulatory Compliance Plan/Updat

This work includes developing plan, quarterly updates to the plan for 8 quarters, and submitting permit/permit equivalency applications to all relevant federal, state and local agencies.

Permits (equivalencies) building, excavation, utility crossings, well, air emissions, Erosion Control, Stormwater, Electrical, Local permits are anticipated.

USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	120.00 HR	10,164	0	0	0	0	10,164	84.70
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	400.00 HR	23,760	0	0	0	0	23,760	59.40
USR AA Permit Charges Allowance		0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00 LS	0	0	0	0	1,000	1,000	1000.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.30	0.30	
	880.00 MI	0	0	0	0	264	264	0.30
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	4.00 DAY	0	0	0	0	152	152	38.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Regulatory Compliance Plan/Up	1.00 EA	36,234	0	0	100	2,616	38,950	38950.00

2005.10.06. Traffic Routing Plan

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	24.00 HR	1,426	0	0	0	0	1,426	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50

2005.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	10.00	10.00	
	24.00	EA	0	0	0	0	240	240	10.00
USR AA Mail			0.00	0.00	0.00	5.00	0.00	5.00	
	1.00	EA	0	0	0	5	0	5	5.00
TOTAL Traffic Routing Plan	1.00	EA	1,734	0	0	5	240	1,979	1978.60
2005.10.07. Site Health and Safety Plan Includes Air Monitoring Plan									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	120.00	HR	7,128	0	0	0	0	7,128	59.40
USR AA Engineer/Scientist IV; Respon d to Comments	32.00	HR	59.40 1,901	0.00 0	0.00 0	0.00 0	0.00 0	59.40 1,901	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Senior Engineer/Scientist I - Draftsman	8.00	HR	67.10 537	0.00 0	0.00 0	0.00 0	0.00 0	67.10 537	67.10
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00
TOTAL Site Health and Safety Plan	1.00	EA	11,106	0	0	100	600	11,806	11805.60
2005.10.15. Performance Testing Plan Source testing, Boiler and Emissions Control System.									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Senior Engineer/Scientist I; Respond to Comments	16.00	HR	67.10 1,074	0.00 0	0.00 0	0.00 0	0.00 0	67.10 1,074	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Contractors Chem Quality Cont rol Officer	24.00	HR	84.70 2,033	0.00 0	0.00 0	0.00 0	0.00 0	84.70 2,033	84.70

2005.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	24.00	HR	2,033	0	0	0	0	2,033	84.70
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Performance Testing Plan	1.00	EA	9,473	0	0	50	1,200	10,723	10723.20
2005.10.41. Subcontracting Plan									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
I	4.00	HR	414	0	0	0	0	414	103.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Site Superintendant	8.00	HR	581	0	0	0	0	581	72.60
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	24.00	EA	0	0	0	0	1,200	1,200	50.00
TOTAL Subcontracting Plan	1.00	EA	1,148	0	0	50	1,200	2,398	2398.40
2005.10.42. Environmental Protection Plan									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	16.00	HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon			59.40	0.00	0.00	0.00	0.00	59.40	
d	4.00	HR	238	0	0	0	0	238	59.40
to Comments									
USR AA Senior Engineer/Scientist I -			67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	8.00	HR	537	0	0	0	0	537	67.10
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	2.00	EA	0	0	0	100	0	100	50.00

2005.10. SUBMITTALS/IMPLEMENTATION PLA	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Environmental Protection Plan	1.00 EA	2,033	0	0	100	1,200	3,333	3332.80
2005.10.43. Correct/Emerg Conting Action Pln								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	16.00 HR	950	0	0	0	0	950	59.40
USR AA Engineer/Scientist IV; Respon d to Comments		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Senior Engineer/Scientist I - Draftsman		67.10	0.00	0.00	0.00	0.00	67.10	
	4.00 HR	268	0	0	0	0	268	67.10
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	2.00 EA	0	0	0	100	0	100	50.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	24.00 EA	0	0	0	0	1,200	1,200	50.00
TOTAL Correct/Emerg Conting Action	1.00 EA	1,764	0	0	100	1,200	3,064	3064.40
TOTAL SUBMITTALS/IMPLEMENTATION PLA	1.00 JOB	92,897	0	0	805	11,856	105,558	105558.20
2005.15. MOBE, SITE WORK, TEMP FACILITIES								
2005.15.01. CLEAR SITE BRUSH								
L AIR AA Clearing - Medium Brush w/o G rub		414.45	202.98	0.00	0.00	0.00	617.43	
	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
TOTAL CLEAR SITE BRUSH	30.00 ACR	12,434	6,089	0	0	0	18,523	617.43
2005.15.02. MOBE EQUIP & FACILITIES								
USR PL Mobe Heavy Equipment		0.00	0.00	0.00	0.00	200.00	200.00	
	5.00 EA	0	0	0	0	1,284	1,284	256.80
TOTAL MOBE EQUIP & FACILITIES	1.00 JOB	0	0	0	0	1,284	1,284	1283.98

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.15.05. TEMPORARY FACILITIES								
2005.15.05.20. TEMPORARY PAVING								
Paving at site offices and equipment building.								
MIL PV Crushed Stone Paving, Small A		5.79	1.78	0.42	0.00	0.00	7.98	
rea	120.00 SY	891	274	65	0	0	1,230	10.25
Prepare and Roll Subbase								
M MIL PV Bituminous Hot Mix Intrm Cour		107.82	28.11	45.00	0.00	0.00	180.94	
se	13.00 TON	1,800	469	751	0	0	3,020	232.32
3954#/CY (2349Kg/M3),Ctrl Plant								
M MIL PV Bituminous Hot Mix Surf Cours		107.82	28.11	45.00	0.00	0.00	180.94	
e	13.00 TON	1,800	469	751	0	0	3,020	232.32
3774#/CY (2242Kg/M3),Ctrl Plant								
M CIV PV Asphalt Seal Coating, 2 Coats		1.63	0.67	1.00	0.00	0.00	3.30	
Coal Tar Emulsion	120.00 SY	251	104	154	0	0	509	4.24
MIL PV Graded Crushed Agg Rdwy Base		37.01	24.05	4.14	0.00	0.00	65.20	
Crs	30.00 CY	1,426	926	159	0	0	2,511	83.72
TOTAL TEMPORARY PAVING		6,168	2,242	1,880	0	0	10,291	
2005.15.05.25. WATER LINE								
Water line for site offices and for required process water.								
M MIL PL 4" (10cm) Galv Steel Pipe		23.72	0.24	8.00	0.00	0.00	31.96	
ASTM A-53, T&C, Sch 40	1000.00 LF	30,450	307	10,272	0	0	41,030	41.03
M MIL PL 4" 90 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4" 45 Degree Ell, 150# MI Gal		52.37	0.53	85.00	0.00	0.00	137.90	
v	10.00 EA	672	7	1,091	0	0	1,771	177.06
M MIL PL 4"Coupling,Straight 150# MI G		52.37	0.53	60.00	0.00	0.00	112.90	
alv	10.00 EA	672	7	770	0	0	1,450	144.96
M MIL PL 4"Nipple,Galv Stl Sch 40, 4"		17.96	0.18	20.00	0.00	0.00	38.14	
4"(10cm) Long	10.00 EA	231	2	257	0	0	490	48.97
M MIL PL 4" Iron Body Gate Valve, Thrd		84.65	0.71	800.00	0.00	0.00	885.36	
125# Bronze Mtd w/Threaded Va	1.00 EA	109	1	1,027	0	0	1,137	1136.78
lve								

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 4"IB Swing Ck Vlv,Brz,Flg&125		195.19	1.79	400.00	0.00	0.00	596.98	
#	1.00 EA	251	2	514	0	0	767	766.50
M MIL PL 4" Flanged Backflow Preventer		183.48	1.68	3000.00	0.00	0.00	3185.16	
w/2Gate&2CK Vlv&Auto Dif Rlf Vlv	1.00 EA	236	2	3,852	0	0	4,090	4089.66
USR PL Piping Bend Thrust Blocks		22.50	0.39	8.00	0.00	0.00	30.89	
	10.00 EA	289	5	103	0	0	397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi		634.86	5.65	0.00	0.00	0.00	640.51	
pe	1.00 EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de (15cm)	1000.00 LF	367	1	51	0	0	420	0.42
USR PL Chlorinate Water Line		126.97	1.07	50.00	0.00	0.00	178.04	
	1.00 JOB	163	1	64	0	0	229	228.60
MIL PL 4" Standard Fire Hydrant		359.13	3.62	927.18	0.00	0.00	1289.93	
One Piece w/5'(1.5M)Burial Se cti	2.00 EA	922	9	2,381	0	0	3,312	1656.24
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il 51 CY/Hr (40M3)/Hr	300.00 CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der Without Compaction	390.00 CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate (15cm) Layers	390.00 CY	1,430	33	0	0	0	1,463	3.75
TOTAL WATER LINE		38,549	942	21,474	0	0	60,965	
2005.15.05.30. PHONE								
USR AA Install Telephone Service		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PHONE		0	0	0	2,000	0	2,000	

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.15.05.35. SEWER 8" sewer, manholes and cleanouts for treated water discharge to POTW and for sanitary waste from offices.									
AIR PL 8" (20CM) Pipe Sch 40			8.98	0.09	6.28	0.00	0.00	15.35	
	1000.00	FT	11,528	116	8,063	0	0	19,707	19.71
AIR PL 8" ABS-PVC (1/4 Bend)			39.28	0.40	64.19	0.00	0.00	103.87	
	10.00	EA	504	5	824	0	0	1,334	133.36
AIR PL 8" ABS-PVC (1/8 Bend)			39.28	0.40	51.18	0.00	0.00	90.86	
	10.00	EA	504	5	657	0	0	1,167	116.66
AIR PL 8" ABS-PVC Wye, Standard			52.37	0.53	40.00	0.00	0.00	92.90	
	10.00	EA	672	7	514	0	0	1,193	119.28
AIR PL 8" ABS-PVC Clean Out Tee w/Pl ug			165.05	1.90	109.00	0.00	0.00	275.96	
	10.00	EA	2,119	24	1,400	0	0	3,543	354.32
MIL PL 4'Dia x 6'Deep Precast Manhol e 8"(20cm)Tk, (1.2M)Dia x (1.8M)Dp			381.35	48.51	233.65	0.00	0.00	663.51	
	4.00	EA	1,959	249	1,200	0	0	3,408	851.93
USR PL Piping Bend Thrust Blocks			22.50	0.39	8.00	0.00	0.00	30.89	
	10.00	EA	289	5	103	0	0	397	39.67
L MIL PL Hyd Test,500-1000LF, 1"-4" Pi pe			634.86	5.65	0.00	0.00	0.00	640.51	
	1.00	EA	815	7	0	0	0	822	822.40
MIL PL Underground Marking Tape,6"Wi de (15cm)			0.29	0.00	0.04	0.00	0.00	0.33	
	1000.00	LF	367	1	51	0	0	420	0.42
MIL PL Trench 1/2 CY Hyd Exc, Hvy So il 51 CY/Hr (40M3)/Hr			1.88	0.83	0.00	0.00	0.00	2.71	
	300.00	CY	724	320	0	0	0	1,044	3.48
MIL PL Backfill Trench w/Sm FEnd Loa der Without Compaction			1.09	0.46	0.00	0.00	0.00	1.55	
	390.00	CY	545	229	0	0	0	774	1.99
MIL PL Compaction, 6" Layers, Vib Pl ate (15cm) Layers			2.86	0.07	0.00	0.00	0.00	2.92	
	390.00	CY	1,430	33	0	0	0	1,463	3.75
USR PL R/R Crossing; Pipe Casing			2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00	LS	4	0	0	25,680	0	25,683	25683.25

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SEWER		21,461	1,003	12,812	25,680	0	60,955	
2005.15.05.40. ELECTRICAL SERVICE								
USR AA Install New 480 3PH Service		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 JOB	0	0	0	20,000	0	20,000	20000.00
TOTAL ELECTRICAL SERVICE		0	0	0	20,000	0	20,000	
2005.15.05.45. GAS SERVICE								
Gas service to provide boiler gas and temporary heating of buildings if needed.								
M MIL PL 8"Dia Sched 40 Stl Gas Dist L		16.69	3.99	15.00	0.00	0.00	35.68	
ine	1000.00 LF	21,429	5,129	19,260	0	0	45,818	45.82
(20cm)Dia Plain End, Tar Coated								
MIL PL 12",150,000 CF/Hr Gas Turb Me		1142.67	11.53	20054.00	0.00	0.00	21208.20	
ter	1.00 EA	1,467	15	25,749	0	0	27,231	27230.80
175 PSI, Direct Digital, Flanged								
B MIL PL 8"(10cm) Gas Pressure Regulat		458.69	4.21	1200.00	0.00	0.00	1662.90	
or	1.00 EA	589	5	1,541	0	0	2,135	2135.12
Flanged End								
B MIL PL 8" Iron Body Gate Valve, Gas		628.47	6.34	1200.00	0.00	0.00	1834.81	
Service	1.00 EA	807	8	1,541	0	0	2,356	2355.85
MIL PL Underground Marking Tape,6"Wi		0.29	0.00	0.04	0.00	0.00	0.33	
de	1000.00 LF	367	1	51	0	0	420	0.42
(15cm)								
MIL PL Trench 1/2 CY Hyd Exc, Hvy So		1.88	0.83	0.00	0.00	0.00	2.71	
il	300.00 CY	724	320	0	0	0	1,044	3.48
51 CY/Hr (40M3)/Hr								
MIL PL Backfill Trench w/Sm FEnd Loa		1.09	0.46	0.00	0.00	0.00	1.55	
der	390.00 CY	545	229	0	0	0	774	1.99
Without Compaction								
MIL PL Compaction, 6" Layers, Vib Pl		2.86	0.07	0.00	0.00	0.00	2.92	
ate	390.00 CY	1,430	33	0	0	0	1,463	3.75
(15cm) Layers								
USR PL R/R Crossing; Pipe Casing		2.86	0.07	0.00	20000.00	0.00	20002.92	
	1.00 LS	4	0	0	25,680	0	25,683	25683.25

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GAS SERVICE			27,362	5,741	48,141	25,680	0	106,925	
TOTAL TEMPORARY FACILITIES	1.00	JOB	93,540	9,928	84,307	73,359	0	261,135	261135.16
2005.15.08. SIGNS, BARRICADES									
2005.15.08. 5. SIGNS									
USR AA Jobsite Signs			0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00	LS	0	0	0	2,000	0	2,000	2000.00
USR AA Hazard Warning Signs			0.00	0.00	0.00	1000.00	0.00	1000.00	
	1.00	LS	0	0	0	1,000	0	1,000	1000.00
TOTAL SIGNS	20.00	EA	0	0	0	3,000	0	3,000	150.00
2005.15.08.10. BARRICADES/TEMP FENCING									
CIV AA Stl Post, 10'OC f/4' Snow Fen			2.05	0.03	0.99	0.00	0.00	3.07	
ce	400.00	LF	822	10	396	0	0	1,227	3.07
TOTAL BARRICADES/TEMP FENCING	1.00	JOB	822	10	396	0	0	1,227	1227.36
2005.15.08.15. EROSION CONTROL									
Assume silt fence on downstream side of all trenches and building excavations.									
MIL AA Silt Fences, Vinyl, 3' High			2.05	0.01	1.22	0.00	0.00	3.28	
With 7.5' Posts	4000.00	LF	8,211	36	4,880	0	0	13,127	3.28
MIL AA TRENCHR,CHN, 24"DP,6"W,WLK-BE			0.00	2.08	0.00	0.00	0.00	2.08	
HND	32.00	HR	0	67	0	0	0	67	2.08
USR AA Silt Fence Removal			0.96	0.00	0.00	0.00	0.00	0.97	
	4000.00	LF	3,849	17	0	0	0	3,866	0.97
USR AA Silt Fence Disposal (Dumpster			0.00	0.00	0.00	0.00	0.25	0.25	
)	4000.00	LF	0	0	0	0	1,000	1,000	0.25
MIL AA Foreman			38.89	0.00	0.00	0.00	0.00	38.89	
	32.00	HR	1,244	0	0	0	0	1,244	38.89
USR AA Maintain Silt Fences			38.39	0.00	0.00	0.00	0.00	38.39	
	80.00	HR	3,071	0	0	0	0	3,071	38.39

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Dump Truck and Driver			0.00	0.00	0.00	50.00	0.00	50.00	
	16.00	HR	0	0	0	800	0	800	50.00
TOTAL EROSION CONTROL	1.00	JOB	16,376	119	4,880	800	1,000	23,175	23174.96
2005.15.08.20. STREET CLEANING									
MIL AA Skid Loader (Bobcat) w/Sweepe			0.00	17.93	0.00	0.00	0.00	17.93	
r Attachment	120.00	HR	0	2,151	0	0	0	2,151	17.93
TOTAL STREET CLEANING	1.00	JOB	0	2,151	0	0	0	2,151	2151.26
2005.15.08.25. DUST CONTROL									
MIL AA Water Truck			0.00	0.00	0.00	50.00	0.00	50.00	
	1000.00	HR	0	0	0	50,000	0	50,000	50.00
TOTAL DUST CONTROL	1.00	JOB	0	0	0	50,000	0	50,000	50000.00
TOTAL SIGNS, BARRICADES	1.00	JOB	17,197	2,281	5,276	53,800	1,000	79,554	79553.58
2005.15.10. GRAVEL CAP Gravel cap for working surface fro site is 472,868 sq. ft. and 6" thick.									
L MIL AA Gravel Surfacing, Delivered			0.73	1.21	19.79	0.00	0.00	21.74	
	11384	CY	8,363	13,826	225,322	0	0	247,511	21.74
TOTAL GRAVEL CAP	10.80	ACR	8,363	13,826	225,322	0	0	247,511	22917.68
2005.15.15. ASPHALT CAP Asphalt cap is 4" of bituminous concrete surfacing over gravel subbase and covers 38,000 sft in part of CPA.									
MIL PV Crushed Stone Paving, Large A			1.54	0.47	0.34	0.00	0.00	2.35	
rea Prepare and Roll Subbase	4222.00	SY	8,363	2,568	1,820	0	0	12,752	3.02
B MIL PV Bituminous Hot Mix Intrm Cour			35.94	9.37	45.00	0.00	0.00	90.31	
se 3954#/CY (2349Kg/M3),Ctrl Plant	700.00	TON	32,303	8,422	40,445	0	0	81,171	115.96
TOTAL ASPHALT CAP	4222.00	SY	40,667	10,990	42,266	0	0	93,922	22.25

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.15.92. SURVEYS									
2005.15.92. 5. INITIAL LAYOUT SURVEY									
USR AA Survey Pipelines			0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00	DAY	0	0	0	5,000	0	5,000	1000.00
USR AA General Survey for Controls			0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00	DAY	0	0	0	10,000	0	10,000	1000.00
USR AA Survey Report and Plots			0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00	LS	0	0	0	4,000	0	4,000	4000.00
USR AA Facility Layout Survey			0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00	DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL INITIAL LAYOUT SURVEY	1.00	JOB	0	0	0	24,000	0	24,000	24000.00
2005.15.92.10. SURVEY CONTROLS Controls & QC check during construction									
USR AA Survey Crew, 3 man			0.00	0.00	0.00	1000.00	0.00	1000.00	
	5.00	DAY	0	0	0	5,000	0	5,000	1000.00
TOTAL SURVEY CONTROLS	1.00	JOB	0	0	0	5,000	0	5,000	5000.00
TOTAL SURVEYS	1.00	JOB	0	0	0	29,000	0	29,000	29000.00
2005.15.97. MEETINGS									
2005.15.97.01. Preconstruction Meeting									
USR AA Site Superintendant			53.13	0.00	0.00	0.00	0.00	53.13	
	16.00	HR	850	0	0	0	0	850	53.13
USR AA Principal Engineer/Scientist III; Lead Engineer			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	10.00	HR	913	0	0	0	0	913	91.30
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	16.00	HR	1,654	0	0	0	0	1,654	103.40
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.35	0.35	
	400.00	MI	0	0	0	0	140	140	0.35

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE; 3 each for 1/2 day and		0.00	0.00	0.00	0.00	42.00	42.00	
1	2.50 DAY	0	0	0	0	105	105	42.00
for full day =2.5 days								
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 EA	0	0	0	0	500	500	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00
USR AA Lodging		0.00	0.00	0.00	0.00	76.00	76.00	
	1.00 DAY	0	0	0	0	76	76	76.00
TOTAL Preconstruction Meeting	1.00 JOB	5,072	0	0	0	969	6,041	6040.88
2005.15.97.03. Coordination Meeting								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	16.00 HR	1,355	0	0	0	0	1,355	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	160.00 MI	0	0	0	0	56	56	0.35
USR AA M&IE; 3 each for 1/2 day and		0.00	0.00	0.00	0.00	42.00	42.00	
1	2.50 DAY	0	0	0	0	105	105	42.00
for full day =2.5 days								
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Parking Airports		0.00	0.00	0.00	0.00	10.00	10.00	
	1.00 EA	0	0	0	0	10	10	10.00

2005.15. MOBE, SITE WORK, TEMP FACILIT	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Lodging		0.00	0.00	0.00	0.00	76.00	76.00	
	1.00 DAY	0	0	0	0	76	76	76.00
TOTAL Coordination Meeting	1.00 JOB	3,010	0	0	0	2,385	5,395	5394.60
TOTAL MEETINGS	2.00 EA	8,081	0	0	0	3,354	11,435	5717.74
TOTAL MOBE, SITE WORK, TEMP FACILIT	1.00 JOB	180,282	43,114	357,171	156,159	5,638	742,364	742364.33

2005.20. TREATMENT SYSTEM CONSTRUCTION

2005.20.01. TREATMENT PLANT BUILDING

Steam Generation and GW treatment plant housed in temporary building (Sprung or Rubb type building) sized 200 ft x 80 ft. Assume air conditioned office to house computers and system controls equipment and operators. Building includes concrete slab. Demolition of these structures assumed after cool down and completion of groundwater pumping.

USR AA Concrete		0.00	0.00	0.00	250.00	0.00	250.00	
	600.00 CY	0	0	0	150,000	0	150,000	250.00
USR AA Rubb Tent 200 x 100		0.00	0.00	0.00	10.00	0.00	10.00	
	16000 SFT	0	0	0	160,000	0	160,000	10.00
MIL AA Structural Fill		5.09	1.76	19.79	0.00	0.00	26.64	
	200.00 CY	1,018	352	3,959	0	0	5,329	26.64
TOTAL TREATMENT PLANT BUILDING	1.00 JOB	1,018	352	3,959	310,000	0	315,329	315328.54

2005.20.05. TREATMENT SYSTEM EQUIP. F&I

2005.20.05. 5. EXPEDITOR/QC EQUIP. FABRICATION

USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
-	200.00 HR	14,520	0	0	0	0	14,520	72.60
Starup/Provecut Project Manager								
USR AA Per Diem/M&IE		0.00	0.00	0.00	0.00	150.00	150.00	
	20.00 DAY	0	0	0	0	3,000	3,000	150.00
USR AA Airfare Trips		0.00	0.00	0.00	0.00	500.00	500.00	
	4.00 EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	20.00 DAY	0	0	0	0	900	900	45.00
USR AA Taxi/Limo		0.00	0.00	0.00	0.00	20.00	20.00	
	4.00 EA	0	0	0	0	80	80	20.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00	JOB	14,520	0	0	0	5,980	20,500	20500.00
2005.20.05.01. EQUIP SUBMITTAL REVIEW									
USR AA Principal Engineer/Scientist III; Contractors CQC System M ana	100.00	HR	103.40 10,340	0.00 0	0.00 0	0.00 0	0.00 0	103.40 10,340	103.40
USR AA Engineer/Scientist IV	600.00	HR	59.40 35,640	0.00 0	0.00 0	0.00 0	0.00 0	59.40 35,640	59.40
USR AA Secretary/Clerical IV	40.00	HR	38.50 1,540	0.00 0	0.00 0	0.00 0	0.00 0	38.50 1,540	38.50
USR AA Blueprints	500.00	EA	0.00 0	0.00 0	0.00 0	3.00 1,500	0.00 0	3.00 1,500	3.00
USR AA Mail	50.00	EA	0.00 0	0.00 0	0.00 0	12.00 600	0.00 0	12.00 600	12.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00	JOB	47,520	0	0	2,100	0	49,620	49620.00
2005.20.05.10. EQUIPMENT PURCHASE/SHIPPING									
USR AA 21000 Gal Tank; Fresh water, Coelescing surge, Boiler surg e.	3.00	LS	0.00 0	0.00 0	25000.00 75,000	0.00 0	0.00 0	25000.00 75,000	25000.00
USR AA Oil Skimmer System	1.00	LS	0.00 0	0.00 0	3500.00 3,500	0.00 0	0.00 0	3500.00 3,500	3500.00
USR AA Water Softeners, (Waste to POTW)	1.00	LS	0.00 0	0.00 0	40000.00 40,000	0.00 0	0.00 0	40000.00 40,000	40000.00
USR AA Water Softener Backwash Sludg e Collector Tank; Waste Salt	1.00	LS	0.00 0	0.00 0	5000.00 5,000	0.00 0	0.00 0	5000.00 5,000	5000.00
USR AA 10,000 Gal Waste Salt Tank	1.00	LS	0.00 0	0.00 0	12000.00 12,000	0.00 0	0.00 0	12000.00 12,000	12000.00
USR AA Steam Boiler	1.00	LS	0.00 0	0.00 0	140000.00 140,000	0.00 0	0.00 0	140000.00 140,000	140000.00
USR AA CEMS System for Boiler Stack	1.00	EA	0.00 0	0.00 0	75000.00 75,000	0.00 0	0.00 0	75000.00 75,000	75000.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Cogen Elec Generator (Steam		0.00	0.00	75000.00	0.00	0.00	75000.00	
Turbine)	2.00 EA	0	0	150,000	0	0	150,000	75000.00
USR AA Heat Exchanger Condensor		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Liquid/Vapor Separator		0.00	0.00	4000.00	0.00	0.00	4000.00	
	1.00 LS	0	0	4,000	0	0	4,000	4000.00
USR AA Vacuum Pump		0.00	0.00	70000.00	0.00	0.00	70000.00	
piping skid; butterfly valves; flexible piping; camlock connections complete.	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Liquid Separator		0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00 LS	0	0	8,000	0	0	8,000	8000.00
USR AA Air Dryer		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Freight		0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00 LS	0	0	40,000	0	0	40,000	40000.00
USR AA Heat Exchanger, Liquids from		0.00	0.00	15000.00	0.00	0.00	15000.00	
Extraction Wells	1.00 EA	0	0	15,000	0	0	15,000	15000.00
USR AA Liquid Cooling Tower		0.00	0.00	15000.00	0.00	0.00	15000.00	
	1.00 LS	0	0	15,000	0	0	15,000	15000.00
USR AA pH Adjust System		0.00	0.00	6000.00	0.00	0.00	6000.00	
	1.00 LS	0	0	6,000	0	0	6,000	6000.00
USR AA Solids Holding Bin for Filter		0.00	0.00	5000.00	0.00	0.00	5000.00	
	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Flocculation System		0.00	0.00	6000.00	0.00	0.00	6000.00	
	1.00 LS	0	0	6,000	0	0	6,000	6000.00
USR AA Coelescing Separator		0.00	0.00	80000.00	0.00	0.00	80000.00	
	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA IAF Separator		0.00	0.00	80000.00	0.00	0.00	80000.00	
	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA 40,000 Waste Water Holding Ta		0.00	0.00	50000.00	0.00	0.00	50000.00	
nk; Cone Bottom w/Skirts	1.00 LS	0	0	50,000	0	0	50,000	50000.00
USR AA Steam Regenerated Carbon Syst		0.00	0.00	80000.00	0.00	0.00	80000.00	
em (Vapor Ph)	1.00 LS	0	0	80,000	0	0	80,000	80000.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Carbon Polishing Vessels (Vap		0.00	0.00	6000.00	0.00	0.00	6000.00	
or	1.00 LS	0	0	6,000	0	0	6,000	6000.00
Phase)								
USR AA Multi Media Vessels		0.00	0.00	10000.00	0.00	0.00	10000.00	
	2.00 LS	0	0	20,000	0	0	20,000	10000.00
USR AA Steam Regenerated GAC System		0.00	0.00	10000.00	0.00	0.00	10000.00	
(Liquid Phase)	2.00 LS	0	0	20,000	0	0	20,000	10000.00
USR AA 300 SCFM Air Compressor with		0.00	0.00	25000.00	0.00	0.00	25000.00	
Dryer	1.00 LS	0	0	25,000	0	0	25,000	25000.00
USR AA Misc. Pumps, Valves, Fittings		0.00	0.00	60000.00	0.00	0.00	60000.00	
,	1.00 LS	0	0	60,000	0	0	60,000	60000.00
Conveyance Pipe & Instruments								
USR AA Spare Parts		0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Initital Chemical Supply		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
TOTAL EQUIPMENT PURCHASE/SHIPPING	1.00 JOB	0	0	1,202,500	0	0	1,202,500	1202500.00
2005.20.05.12. INSTRUMENTATION/CONTROLLERS								
USR AA I/O and Cabinet		0.00	0.00	17000.00	0.00	0.00	17000.00	
	1.00 LS	0	0	17,000	0	0	17,000	17000.00
USR AA Software and Processors		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Autodailer		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	480.00 HR	43,824	0	0	0	0	43,824	91.30
Instrument Engineer								
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	500.00 HR	36,300	0	0	0	0	36,300	72.60

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL INSTRUMENTATION/CONTROLLERS	1.00	JOB	83,028	0	38,000	0	0	121,028	121028.00
2005.20.05.15. EQUIPMENT INSTALLATION									
USR AA Crane Rental			0.00	0.00	0.00	4000.00	0.00	4000.00	
	2.00	WK	0	0	0	8,000	0	8,000	4000.00
USR AA Materials/Grout/Misc			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	JOB	0	0	20,000	0	0	20,000	20000.00
MIL AA Eq Oper, Medium			56.51	0.00	0.00	0.00	0.00	56.51	
	160.00	HR	9,041	0	0	0	0	9,041	56.51
MIL AA Laborer (Semi-Skilled)			38.39	0.00	0.00	0.00	0.00	38.39	
	480.00	HR	18,427	0	0	0	0	18,427	38.39
UPB AA FORK LIFT,R/T 8,000#,16.00'L -HT			0.00	11.94	0.00	0.00	0.00	11.94	
	160.00	HR	0	1,911	0	0	0	1,911	11.94
TOTAL EQUIPMENT INSTALLATION	1.00	JOB	27,468	1,911	20,000	8,000	0	57,378	57378.48
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	172,536	1,911	1,260,500	10,100	5,980	1,451,026	1451026.48
2005.20.10. INSTALL WELLS									
2005.20.10. 5. EXTRACTION WELLS THERMAL									
Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,									
2005.20.10. 5.20. "D" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	4345.00	LFT	0	0	0	586,575	0	586,575	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	586,575	0	586,575	586575.00
2005.20.10. 5.25. "E" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	1375.00	LFT	0	0	0	185,625	0	185,625	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	185,625	0	185,625	185625.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.20.10. 5.30. EXTRACTION PUMPS								
USR AA Extraction Pumps Incl Controllers	28.00 EA	0.00 0	0.00 0	2500.00 70,000	0.00 0	0.00 0	2500.00 70,000	2500.00
USR AA Extraction Pumps Incl Controllers; Top Loading for LNA	10.00 EA	0.00 0	0.00 0	2700.00 27,000	0.00 0	0.00 0	2700.00 27,000	2700.00
USR AA 600 SCFM Compressor to run pu mps	1.00 EA	0.00 0	0.00 0	40000.00 40,000	0.00 0	0.00 0	40000.00 40,000	40000.00
USR AA Discharge Tubing Pump to Wellhead; SS	5016.00 LFT	0.00 0	0.00 0	11.00 55,176	0.00 0	0.00 0	11.00 55,176	11.00
USR AA Air Supply Tubing Wellhead to Pumps	5016.00 LFT	0.00 0	0.00 0	6.00 30,096	0.00 0	0.00 0	6.00 30,096	6.00
USR AA Pulse Counters w/ 4-20 ma Sig nal	38.00 EA	0.00 0	0.00 0	395.00 15,010	0.00 0	0.00 0	395.00 15,010	395.00
USR AA Liquid Level Measurment, Portable Magnahelic	1.00 EA	0.00 0	0.00 0	1000.00 1,000	0.00 0	0.00 0	1000.00 1,000	1000.00
USR AA Downwell Liquid Level Bubbler Tube	5000.00 LFT	0.00 0	0.00 0	2.00 10,000	0.00 0	0.00 0	2.00 10,000	2.00
USR AA Spare Parts; Initial Supply f or Pumps	1.00 LS	0.00 0	0.00 0	500.00 500	0.00 0	0.00 0	500.00 500	500.00
USR AA Connection Fittings; Air & Discharg Tubing/Manifolds, Et c.	38.00 EA	0.00 0	0.00 0	200.00 7,600	0.00 0	0.00 0	200.00 7,600	200.00
USR AA 35 GPM Turbine Pump, High Hea d	5.00 EA	0.00 0	0.00 0	15000.00 75,000	0.00 0	0.00 0	15000.00 75,000	15000.00
TOTAL EXTRACTION PUMPS	31.00 EA	0	0	331,382	0	0	331,382	10689.74
2005.20.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps	43.00 EA	0.00 0	0.00 0	0.00 0	725.00 31,175	0.00 0	725.00 31,175	725.00
USR AA Install Down-hole Instruments	62.00 EA	0.00 0	0.00 0	0.00 0	450.00 27,900	0.00 0	450.00 27,900	450.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL INSTALL PUMPS, INSTRUMENTS	31.00	EA	0	0	0	59,075	0	59,075	1905.65
2005.20.10. 5.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	31.00	EA	0	0	0	7,750	0	7,750	250.00
TOTAL WELL TOP COMPLETION	31.00	EA	0	0	0	7,750	0	7,750	250.00
2005.20.10. 5.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	33.00	EA	0	0	0	33,000	0	33,000	1000.00
TOTAL WELL DEVELOPMENT	31.00	EA	0	0	0	33,000	0	33,000	1064.52
TOTAL EXTRACTION WELLS THERMAL	1.00	JOB	0	0	331,382	872,025	0	1,203,407	1203407.00
2005.20.10.10. STEAM INJECTION WELLS									
Injection well pricing includes development, handling of cuttings and liquid wastes,									
2005.20.10.10.20. "D" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	1467.00	LFT	0	0	0	198,045	0	198,045	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	198,045	0	198,045	198045.00
2005.20.10.10.25. "E" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	566.00	LFT	0	0	0	76,410	0	76,410	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	76,410	0	76,410	76410.00
2005.20.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	10.00	EA	0	0	0	16,250	0	16,250	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	16,250	0	16,250	16250.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2005.20.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	10.00	EA	0	0	0	2,500	0	2,500	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	2,500	0	2,500	2500.00
2005.20.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00	EA	0	0	0	10,000	0	10,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	303,205	0	303,205	303205.00
2005.20.10.15. REINJECTION WELLS									
2005.20.10.15.25. "E" ZONE WELLS									
USR AA Reinjection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	1350.00	LFT	0	0	0	182,250	0	182,250	135.00
TOTAL "E" ZONE WELLS	1.00	JOB	0	0	0	182,250	0	182,250	182250.00
2005.20.10.15.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	3.00	EA	0	0	0	4,875	0	4,875	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	4,875	0	4,875	4875.00
2005.20.10.15.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	3.00	EA	0	0	0	750	0	750	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	750	0	750	750.00
2005.20.10.15.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	3.00	EA	0	0	0	3,000	0	3,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	3,000	0	3,000	3000.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL REINJECTION WELLS	1.00	JOB	0	0	0	190,875	0	190,875	190875.00
2005.20.10.20. MONITORING WELLS									
2005.20.10.20. 5. INSTALL WELLS									
USR AA Install 4" Monitoring Wells,			0.00	0.00	0.00	100.00	0.00	100.00	
SS Casing and Screens	1001.00	LFT	0	0	0	100,100	0	100,100	100.00
TOTAL INSTALL WELLS	39.00	EA	0	0	0	100,100	0	100,100	2566.67
2005.20.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT									
M AIR AA Lo Flo Pump & Teflon Tubing			0.00	0.00	550.00	0.00	0.00	550.00	
	7.00	EA	0	0	3,850	0	0	3,850	550.00
USR AA Portable Air Compressor			0.00	0.00	1835.00	0.00	0.00	1835.00	
	1.00	EA	0	0	1,835	0	0	1,835	1835.00
USR AA Misc Tools & Sampling Equipme nt			0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00	EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and Discharge/Sampling System			0.00	0.00	0.00	100.00	0.00	100.00	
	7.00	EA	0	0	0	700	0	700	100.00
USR AA Sample Pump Tubing, Teflon Li ned			0.00	0.00	3.50	0.00	0.00	3.50	
	1008.00	LFT	0	0	3,528	0	0	3,528	3.50
USR AA Slip On Well Cap Assbly			0.00	0.00	65.00	0.00	0.00	65.00	
	7.00	EA	0	0	455	0	0	455	65.00
USR AA Flexible Discharge Tubing Adaptor			0.00	0.00	23.00	0.00	0.00	23.00	
	7.00	EA	0	0	161	0	0	161	23.00
USR AA Digital Cycle Controller for Lo Flow Bladder Pump			0.00	0.00	2240.00	0.00	0.00	2240.00	
	1.00	EA	0	0	2,240	0	0	2,240	2240.00
USR AA Multi-parameter Flow Cell & Meter			0.00	0.00	4495.00	0.00	0.00	4495.00	
	1.00	EA	0	0	4,495	0	0	4,495	4495.00
USR AA Liquid Level Measurment/Drawd own Meter			0.00	0.00	815.00	0.00	0.00	815.00	
	1.00	EA	0	0	815	0	0	815	815.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	18,379	700	0	19,079	19079.00
2005.20.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole			0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	14.00	EA	0	0	0	22,750	0	22,750	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	22,750	0	22,750	22750.00
2005.20.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pi			0.00	0.00	0.00	250.00	0.00	250.00	
pe	7.00	EA	0	0	0	1,750	0	1,750	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	1,750	0	1,750	1750.00
2005.20.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	7.00	EA	0	0	0	7,000	0	7,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	7,000	0	7,000	7000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	18,379	132,300	0	150,679	150679.00

2005.20.10.25. TREAT WELL DRILL LIQUIDS/CUTTING

During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.

The liquiids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.

USR AA RO/RO MOBE/RENTAL			0.00	0.00	0.00	400.00	0.00	400.00	
	24.00	EA	0	0	0	9,600	0	9,600	400.00
USR AA Frac Tank Rental			0.00	1000.00	0.00	0.00	0.00	1000.00	
	10.00	MO	0	10,000	0	0	0	10,000	1000.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Treat Contaminated Water		0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	91000 GAL	0	0	0	22,750	0	22,750	0.25
USR AA Onsite Steam Strip Drill		1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	468.00 TON	842	15	0	0	25,740	26,597	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.09 MGL	0	0	0	8,103	0	8,103	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.09 MGL	0	0	0	1,316	0	1,316	14465.00
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.03 KLB	0	0	0	1,006	0	1,006	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.04 KLB	0	0	0	681	0	681	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	842	10,015	0	43,664	25,740	80,262	80261.56

2005.20.10.30. ANALYTICALS SOILS
Well installation soil samples - initial baseline.

M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW8310)	22.00 EA	0	0	0	3,542	0	3,542	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	22.00 EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	9,416	0	9,416	9416.00

2005.20.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	66.00 EA	0	0	0	9,240	0	9,240	140.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	155.00	0.00	155.00	
70)	66.00	EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	66.00	EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600			0.00	0.00	0.00	55.00	0.00	55.00	
	66.00	EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290			0.00	0.00	0.00	950.00	0.00	950.00	
)	11.00	EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00	JOB	0	0	0	36,190	0	36,190	36190.00

2005.20.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geolog			59.40	0.00	0.00	0.00	0.00	59.40	
ist	160.00	HR	9,504	0	0	0	0	9,504	59.40
USR AA Engineer/Scientist IV, Sampli			59.40	0.00	0.00	0.00	0.00	59.40	
ng	40.00	HR	2,376	0	0	0	0	2,376	59.40
Lead									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Technician/Analyst IV, Sampli			33.00	0.00	0.00	0.00	0.00	33.00	
ng	80.00	HR	2,640	0	0	0	0	2,640	33.00
Tech									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	16.00	HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00	MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging			0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	10.00	DAY	0	0	0	0	1,980	1,980	198.00

2005.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	10.00	DAY	0	0	0	0	420	420	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	400.00	LFT	0	0	1,000	0	0	1,000	2.50
USR AA Misc Sampling			0.00	0.00	400.00	0.00	0.00	400.00	
Equipment/Materials	1.00	LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00	JOB	19,061	0	1,400	50	3,134	23,645	23644.80
TOTAL INSTALL WELLS	1.00	JOB	19,903	10,015	351,161	1,587,725	28,874	1,997,678	1997678.36
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	193,457	12,278	1,615,620	1,907,825	34,854	3,764,033	3764033.38
TOTAL CONSTRUCTION STEP 1	1.00	JOB	1,452,084	122,508	1,998,689	2,349,989	237,187	6,160,457	6160456.78

2006.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006. CONSTRUCTION/STARTUP STEP 1								
2006.05. GENERAL CONDITIONS								
2006.05.01. FIELD SUPERVISION & MANAGEMENT Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.								
USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	1000.00 HR	66,815	0	0	0	0	66,815	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	1000.00 HR	43,470	0	0	0	0	43,470	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	1000.00 HR	53,130	0	0	0	0	53,130	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	1000.00 HR	19,320	0	0	0	0	19,320	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	1000.00 HR	37,030	0	0	0	0	37,030	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	1000.00 HR	43,470	0	0	0	0	43,470	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	1000.00 HR	51,189	0	0	0	0	51,189	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	1000.00 HR	0	5,500	0	0	0	5,500	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	18.00 MO	0	0	0	0	18,000	18,000	1000.00
for 6 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	811.00 DAY	0	0	0	0	23,114	23,114	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	20.00 EA	0	0	0	0	10,000	10,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	20.00 EA	0	0	0	0	400	400	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	20000 MI	0	0	0	0	7,000	7,000	0.35

2006.05. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00	JOB	314,424	5,500	0	0	58,514	378,437	378437.00
2006.05.02. ADMINISTRATION HOME OFFICE									
Scheduler, also serves in cost control. Average 20 hrs/wk.									
USR AA Program Manager.			103.40	0.00	0.00	0.00	0.00	103.40	
	171.00	HR	17,681	0	0	0	0	17,681	103.40
USR AA Prin. Engineer/Scientist I;			91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	200.00	HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	419.00	HR	16,132	0	0	0	0	16,132	38.50
USR AA Engineer/Scientist IV -			59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	804.00	HR	47,758	0	0	0	0	47,758	59.40
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	105.00	HR	10,857	0	0	0	0	10,857	103.40
Health and Safety Manager									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	105.00	HR	10,857	0	0	0	0	10,857	103.40
gr									
USR AA Mileage on Personal Car Pjm			0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 52 wks	20800	MI	0	0	0	0	6,448	6,448	0.31
*									
USR AA Lodging; 1.5 mo for PjM plus			0.00	0.00	0.00	0.00	80.00	80.00	
additional visits during	100.00	DAY	0	0	0	0	8,000	8,000	80.00
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	100.00	DAY	0	0	0	0	3,800	3,800	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	3.00	EA	0	0	0	0	1,500	1,500	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	3.00	DAY	0	0	0	0	135	135	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	6.00	EA	0	0	0	0	120	120	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	121,545	0	0	0	20,003	141,548	141547.50

2006.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.05.03. PURCHASING								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	600.00 HR	43,560	0	0	0	0	43,560	72.60
USR AA Secretary/Clerical IV Home		38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	64.00 HR	2,464	0	0	0	0	2,464	38.50
TOTAL PURCHASING	1.00 JOB	46,024	0	0	0	0	46,024	46024.00
2006.05.06. FIRST AID, FIRE, TRAFFIC, SECUR								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	4380.00 HR	0	0	0	65,700	0	65,700	15.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	0	0	0	65,700	0	65,700	65700.00
2006.05.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	40.00 DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	100.00 DAY	0	0	1,200	0	0	1,200	12.00
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	6.00 MO	0	4,800	0	0	0	4,800	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	6.00 MO	0	2,100	0	0	0	2,100	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	6.00 MO	0	2,550	0	0	0	2,550	425.00
USR AA Labor Allowance for Site		120.00	0.00	0.00	0.00	0.00	120.00	
Specific Training	15.00 EA	1,800	0	0	0	0	1,800	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	15.00 EA	3,000	0	0	0	0	3,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	15.00 EA	0	0	0	5,250	0	5,250	350.00

2006.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL HEALTH & SAFETY	1.00 JOB	4,800	9,450	3,890	5,250	0	23,390	23390.00
2006.05.09. TEMP CONSTRUCTION FACILITIES								
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	6.00 MO	0	0	0	0	450	450	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	6.00 MO	0	0	0	0	2,400	2,400	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	12.00 MO	0	0	0	0	1,020	1,020	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	6.00 MO	0	0	2,400	0	0	2,400	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	6.00 MO	0	3,600	0	0	0	3,600	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	6.00 MO	0	3,000	0	0	0	3,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	6.00 MO	0	600	0	0	0	600	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	6.00 MO	0	0	0	0	300	300	50.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	7,200	2,400	2,400	6,570	18,570	18570.00
2006.05.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	6.00 MO	0	0	0	0	3,000	3,000	500.00

2006.05. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	6.00 MO	0	0	0	0	2,700	2,700	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	6.00 MO	0	0	0	600	1	601	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	600	5,701	6,301	6300.60
TOTAL GENERAL CONDITIONS	1.00 JOB	486,792	22,150	6,290	73,950	90,787	679,969	679969.10
2006.20. TREATMENT SYSTEM CONSTRUCTION								
2006.20.05. TREATMENT SYSTEM EQUIPMENT								
2006.20.05.13. COMPUTER								
USR AA Computer		0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00 EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software		0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00 EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support		0.00	0.00	0.00	450.00	0.00	450.00	
Plan	1.00 YR	0	0	0	450	0	450	450.00
USR AA Software Training		0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00 LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist III		79.20	0.00	0.00	0.00	0.00	79.20	
	40.00 HR	3,168	0	0	0	0	3,168	79.20
TOTAL COMPUTER	1.00 JOB	6,072	0	5,300	4,450	0	15,822	15822.00
2006.20.05.16. TREATMENT SYSTEM ELECTRICAL & IN								
USR AA Electrical/Instrumentation		0.00	0.00	250000.00	0.00	0.00	250000.00	
Allowance	1.00 LS	0	0	250,000	0	0	250,000	250000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00 JOB	0	0	250,000	0	0	250,000	250000.00

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.20.05.17. MECHANICAL								
USR AA Mechanical Subcontractor Pipi		0.00	0.00	0.00	18000.00	0.00	18000.00	
ng	1.00 JOB	0	0	0	18,000	0	18,000	18000.00
GW Treatment/Steam Systems								
USR AA Plumbing Building		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
USR AA HVAC		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 JOB	0	0	0	15,000	0	15,000	15000.00
TOTAL MECHANICAL	1.00 JOB	0	0	0	48,000	0	48,000	48000.00
2006.20.05.20. SPH 6Ph HEATING COMPONENTS								
See backup for costs per Greg Beyke of Thermal Remediation Systems dated 6/14/01 Materials include cable, graphite, steel shot, shiipping, hydrating solution, Electrodes, Electrode liquid conduit, and Electrode heads.								
USR AA Electrodes Materials & Shippi		0.00	0.00	3182.61	0.00	0.00	3182.61	
ng	40.00 EA	0	0	127,304	0	0	127,304	3182.61
USR AA Power Control System for		0.00	0.00	0.00	600485.00	0.00	600485.00	
Electrodes Purchase & Mobe	1.00 EA	0	0	0	600,485	0	600,485	600485.00
USR AA Power Control System Salvage		0.00	0.00	-87975.00	0.00	0.00	-87975.00	
Value	1.00 EA	0	0	-87,975	0	0	-87,975	-87975.00
USR AA Abovegrade Cables & ERH Syste		0.00	0.00	1187.00	0.00	0.00	1187.00	
m	40.00 EA	0	0	47,480	0	0	47,480	1187.00
Materials								
USR AA Cable Salvage Value		0.00	0.00	-11178.00	0.00	0.00	-11178.00	
	1.00 EA	0	0	-11,178	0	0	-11,178	-11178.00
USR AA TRS On-Site Installation		0.00	0.00	0.00	106.00	0.00	106.00	
Training/Supervision	80.00 HR	0	0	0	8,480	0	8,480	106.00
USR AA TRS Travel/Per Diems		0.00	0.00	0.00	10900.00	0.00	10900.00	
	1.00 LS	0	0	0	10,900	0	10,900	10900.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	133.00	0.00	133.00	
	54.00 HR	0	0	0	7,182	0	7,182	133.00
USR AA Electrode Connection Labor		0.00	0.00	0.00	101.00	0.00	101.00	
	115.00 HR	0	0	0	11,615	0	11,615	101.00

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCS Testing			0.00	0.00	0.00	106.00	0.00	106.00	
	80.00	HR	0	0	0	8,480	0	8,480	106.00
USR AA Supervising Professional			0.00	0.00	0.00	143.00	0.00	143.00	
	6.00	HR	0	0	0	858	0	858	143.00
TOTAL SPH 6Ph HEATING COMPONENTS	1.00	JOB	0	0	75,631	648,000	0	723,631	723631.40
2006.20.05.25. VEA & DPT COMPONENTS									
USR AA Electrode Arrays			0.00	0.00	15.00	0.00	0.00	15.00	
	8560.00	LFT	0	0	128,400	0	0	128,400	15.00
USR AA Data Collection Equipment			0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00	LS	0	0	70,000	0	0	70,000	70000.00
USR AA Fiber Optic Cable			0.00	0.00	2.50	0.00	0.00	2.50	
	8560.00	LFT	0	0	21,400	0	0	21,400	2.50
TOTAL VEA & DPT COMPONENTS	1.00	JOB	0	0	219,800	0	0	219,800	219800.00
TOTAL TREATMENT SYSTEM EQUIPMENT	1.00	JOB	6,072	0	550,731	700,450	0	1,257,253	1257253.40
2006.20.07. WELL INSTRUMENTS/CONTROLS									
2006.20.07.10. INSTRUMENT CABLE TO WELLHEADS									
MIL EL 6" Stl Cable Tray-Strt Sect,12' (15cm)w/ hangers & Supports	500.00	LF	6.73 4,323	0.03 17	5.91 3,793	0.00 0	0.00 0	12.67 8,134	16.27
L MIL EL 12"Stl Cable Tray-Strt Sect,12' (31cm)w/ hangers & Supports	2500.00	LF	2.25 7,228	0.01 29	6.25 20,076	0.00 0	0.00 0	8.52 27,333	10.93
MIL EL 12"(31cm)Horz 90,Stl Cable Tray	5.00	EA	79.01 507	0.32 2	38.68 248	0.00 0	0.00 0	118.01 758	151.52
MIL EL 12"(31cm)Horz "T",Stl Cable Tray	40.00	EA	166.80 8,567	0.67 34	70.24 3,608	0.00 0	0.00 0	237.71 12,208	305.21
MIL EL 12"-6" Reducer,Steel Cable Tray	40.00	EA	52.60 2,701	0.21 11	29.44 1,512	0.00 0	0.00 0	82.25 4,224	105.61

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR EL Signal Wire			60.05	0.24	20.00	0.00	0.00	80.29	
	285.00	KLF	21,973	88	7,319	0	0	29,380	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00	JOB	45,300	182	36,556	0	0	82,037	82037.10
2006.20.07.30. WELL INSTRUMENTATION									
USR AA Level Controller			63.49	0.57	600.00	0.00	0.00	664.05	
	33.00	EA	2,095	19	19,800	0	0	21,914	664.05
USR AA Pressure Indicator			63.49	0.57	1000.00	0.00	0.00	1064.05	
	43.00	EA	2,730	24	43,000	0	0	45,754	1064.05
USR AA Temperature Indicator			63.49	0.57	500.00	0.00	0.00	564.05	
	50.00	EA	3,174	28	25,000	0	0	28,203	564.05
USR AA Steam Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	11.00	EA	1,397	12	16,500	0	0	17,909	1628.10
USR AA Water Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	2.00	EA	254	2	3,000	0	0	3,256	1628.10
USR AA Vapor Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	33.00	EA	4,190	37	49,500	0	0	53,727	1628.10
USR AA Amperage Meter			126.97	1.13	500.00	0.00	0.00	628.10	
	40.00	EA	5,079	45	20,000	0	0	25,124	628.10
TOTAL WELL INSTRUMENTATION	1.00	JOB	18,919	168	176,800	0	0	195,887	195887.15
2006.20.07.35. VERTICAL ELECTRODE ARRAYS									
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	40.00	0.00	40.00	
Grouting, Vertical	8560.00	LFT	0	0	0	342,400	0	342,400	40.00
USR AA Drilling, Installing VEA,			0.00	0.00	0.00	50.00	0.00	50.00	
Grouting, Horizontal in Sloug h	2600.00	LFT	0	0	0	130,000	0	130,000	50.00
USR AA Horizontal Drill Subcontracto r			0.00	0.00	0.00	100.00	0.00	100.00	
Mobe/Demobe	1.00	LS	0	0	0	100	0	100	100.00
TOTAL VERTICAL ELECTRODE ARRAYS	38.00	EA	0	0	0	472,500	0	472,500	12434.21

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.20.07.40. ELECTRICAL POWER TO WELLS									
AIR EL 2" R.S. Conduit w/Coupling &			6.65	0.03	2.03	0.00	0.00	8.71	
Supp.	800.00	LF	6,826	31	2,085	0	0	8,942	11.18
AIR EL 3" R.S. Conduit w/Coupling &			7.31	0.03	4.10	0.00	0.00	11.44	
Supp.	800.00	LF	7,509	34	4,211	0	0	11,754	14.69
AIR EL 1" R.S. Conduit w/Coupling &			4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	800.00	LF	4,298	20	976	0	0	5,293	6.62
CIV EL 1/4" Nylon Pull Cord Installe			0.29	0.00	0.39	0.00	0.00	0.68	
d	8000.00	LF	2,960	12	3,974	0	0	6,947	0.87
Cable Installation Methods									
MIL EL No 12-Type THWN			159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00	MLF	409	2	197	0	0	608	304.13
MIL EL No 8-Type THWN			264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00	MLF	679	3	590	0	0	1,272	635.88
MIL EL No 10-Type THWN			200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00	MLF	515	2	316	0	0	834	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00	JOB	23,196	104	12,350	0	0	35,650	35649.94
TOTAL WELL INSTRUMENTS/CONTROLS	1.00	JOB	87,414	454	225,706	472,500	0	786,074	786074.19
2006.20.15. PIPING									
2006.20.15. 5. VAPOR RECOVERY SYSTEM									
L MIL PL 4"(10cm) Black Pipe,PE Sch40			5.94	0.14	4.72	0.00	0.00	10.79	
A53	690.00	LF	5,259	123	4,180	0	0	9,562	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40			9.62	0.52	8.92	0.00	0.00	19.06	
A53	690.00	LF	8,524	459	7,899	0	0	16,882	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40			5.94	0.14	7.18	0.00	0.00	13.26	
A53	230.00	LF	1,753	41	2,121	0	0	3,915	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std			360.80	19.42	125.85	0.00	0.00	506.07	
Wt	15.00	EA	6,949	374	2,424	0	0	9,747	649.78

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 6" 90 Degree LR Weld Ell, Std			274.51	6.42	67.81	0.00	0.00	348.74	
Wt	5.00	EA	1,762	41	435	0	0	2,239	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	304.00	LF	3,090	72	1,276	0	0	4,438	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std			166.33	3.89	27.57	0.00	0.00	197.80	
Wt	90.00	EA	19,221	450	3,186	0	0	22,857	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	29.00	EA	1,179	28	101	0	0	1,307	45.07
L AIR PL Slip On Flange 4"			59.36	1.39	25.70	0.00	0.00	86.45	
	145.00	EA	11,052	258	4,785	0	0	16,095	111.00
AIR AA Slip On Flange 6"			158.30	3.70	40.70	0.00	0.00	202.71	
	10.00	EA	1,583	37	407	0	0	2,027	202.71
MIL PL 8" Weld Neck Flange, 150#			156.02	8.40	100.07	0.00	0.00	264.49	
	10.00	EA	2,003	108	1,285	0	0	3,396	339.59
MIL PL 4" x 3" Reducer, Eccentric			166.64	3.90	26.44	0.00	0.00	196.98	
	58.00	EA	12,409	290	1,969	0	0	14,669	252.91
MIL PL 4" Cap, Welded, Std Wt			83.32	1.95	11.49	0.00	0.00	96.76	
	2.00	EA	214	5	30	0	0	248	124.24
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	174.00	EA	22,337	213	1,683	0	0	24,232	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	11.91	0.00	0.00	131.77	
ets	10.00	EA	1,524	15	153	0	0	1,692	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	13.30	0.00	0.00	133.16	
ets	10.00	EA	1,524	15	171	0	0	1,710	170.97
USR PL Pipe Supports			59.36	1.39	200.00	0.00	0.00	260.75	
	125.00	EA	9,528	223	32,099	0	0	41,850	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate			256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	2.00	EA	659	7	1,562	0	0	2,227	1113.50
125 #									

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate			224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	2.00	EA	576	6	939	0	0	1,521	760.56
125 #									
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate			114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	58.00	EA	8,540	78	16,581	0	0	25,199	434.46
125 #									
USR PL Fit/Cut/Weld 4" pipe to 6" or			237.46	5.55	0.00	0.00	0.00	243.01	
8"	29.00	EA	8,842	207	0	0	0	9,048	312.02
(No Tees required)									
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe			3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	690.00	LF	3,460	24	2,215	0	0	5,699	8.26
s									
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv			3.91	0.03	1.00	0.00	0.00	4.93	
r	230.00	LF	1,153	8	295	0	0	1,457	6.33
w/Fire Retardant Jackets									
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co			7.81	0.05	1.00	0.00	0.00	8.86	
ver	690.00	LF	6,920	47	886	0	0	7,853	11.38
w/Fire Retardant Jackets									
L MIL PL 0.006" Alum Insul Jacket w/Ba			6.25	0.04	0.16	0.00	0.00	6.45	
nds	2200.00	SF	17,651	121	445	0	0	18,216	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00	JOB	157,714	3,248	87,126	0	0	248,087	248087.30
2006.20.15.10. LIQUID RECOVERY SYSTEM									
AIR PL Pipe, Iron, Threaded, Sch 80			7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	702.00	LF	6,891	63	5,588	0	0	12,542	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	1200.00	LF	12,196	285	5,037	0	0	17,518	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std			96.23	2.25	16.68	0.00	0.00	115.16	
Wt	5.00	EA	618	14	107	0	0	739	147.86
MIL PL 3"Tee,Full Size Butt Weld Std			143.91	3.37	36.78	0.00	0.00	184.06	
Wt	5.00	EA	924	22	236	0	0	1,182	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	87.00	EA	3,537	83	302	0	0	3,921	45.07

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR PL Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	174.00	EA	17,683	414	4,513	0	0	22,610	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	116.00	EA	7,073	67	580	0	0	7,721	66.56
M MIL PL 3" Bronze 125# Gate Valve			70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	3.00	EA	272	2	368	0	0	642	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc			23.09	0.19	25.86	0.00	0.00	49.14	
rd	29.00	EA	860	7	963	0	0	1,830	63.09
Lubricated,Wrench Oper w/Wrench									
M MIL PL 2" Single Disc Type Check Val			37.62	0.33	72.27	0.00	0.00	110.23	
ve	29.00	EA	1,401	12	2,691	0	0	4,104	141.53
IB Wafer Type- 125#									
M MIL PL 2" Bronze 125# Gate Valve			46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	58.00	EA	3,438	29	2,359	0	0	5,827	100.46
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00	EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover			4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	702.00	LF	4,052	28	896	0	0	4,976	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov			4.75	0.03	1.23	0.00	0.00	6.02	
er	1200.00	LF	7,322	50	1,902	0	0	9,274	7.73
w/Fire Retardant Jackets									
L MIL PL 0.006" Alum Insul Jacket w/Ba			7.81	0.05	0.16	0.00	0.00	8.02	
nds	515.00	SF	5,165	35	104	0	0	5,304	10.30
USR AA Flexible Hose; SS; 5' long; 2			14.84	0.35	150.00	0.00	0.00	165.19	
"	39.00	EA	579	14	5,850	0	0	6,442	165.19
dia.									
TOTAL LIQUID RECOVERY SYSTEM	1.00	JOB	75,957	1,161	31,496	0	0	108,614	108614.16

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.20.15.11. EXTRACTION WELLHEAD SPOOL/FTG									
Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.									
USR AA Wellhead Fittings/Piping (Sho			474.91	11.11	350.00	0.00	0.00	836.02	
p	33.00	EA	15,672	367	11,550	0	0	27,589	836.02
Fabricated)									
USR AA Connection Fittings; Air &			118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La	33.00	EA	3,918	92	0	0	0	4,010	121.50
bor									
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00	JOB	19,590	458	11,550	0	0	31,598	31598.22
2006.20.15.15. STEAM INJECTION SYSTEM									
2006.20.15.15. 5. MAIN HEADER PIPING									
MIL PL 4"(10cm) A-53 Pipe, Sch 40			8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	1500.00	LF	17,291	174	13,022	0	0	30,488	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac			52.37	0.53	50.23	0.00	0.00	103.13	
k	15.00	EA	1,009	10	967	0	0	1,986	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	10.00	EA	407	10	35	0	0	451	45.07
MIL PL 4" Tee, Red Out Butt Weld Std			249.95	5.85	51.39	0.00	0.00	307.19	
Wt	10.00	EA	3,209	75	660	0	0	3,944	394.43
AIR AA Slip On Flange 4"			105.54	2.47	25.70	0.00	0.00	133.70	
	12.00	EA	1,266	30	308	0	0	1,604	133.70
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	12.00	EA	1,540	15	116	0	0	1,671	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En			306.39	2.92	244.12	0.00	0.00	553.44	
ds	4.00	EA	1,574	15	1,254	0	0	2,842	710.60
Bellows w/Int Sleeves&Ext Covers									
MIL PL Pipe Support			76.64	1.58	27.24	0.00	0.00	105.46	
	150.00	EA	14,761	304	5,246	0	0	20,310	135.40

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1"x1"Brz Press Relief Vlv, Th		33.86	0.28	43.73	0.00	0.00	77.87	
rd	5.00 EA	217	2	281	0	0	500	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov		5.10	0.03	1.59	0.00	0.00	6.73	
er	1500.00 LF	9,825	67	3,071	0	0	12,962	8.64
w/Fire Retardant Jackets								
MIL PL 0.006" Alum Insul Jacket w/Ba		8.93	0.06	0.16	0.00	0.00	9.15	
nds	750.00 SF	8,596	59	152	0	0	8,807	11.74
		---	---	---	---	---	---	
TOTAL MAIN HEADER PIPING	1.00 JOB	59,696	760	25,111	0	0	85,567	85566.99
2006.20.15.15.10. LATERAL PIPING								
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	200.00 LF	2,033	48	840	0	0	2,920	14.60
AIR AA Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	80.00 EA	6,332	148	1,616	0	0	8,096	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	100.00 EA	6,098	58	500	0	0	6,656	66.56
MIL PL 3" Tee, Red Out Butt Weld Std		143.91	3.37	36.94	0.00	0.00	184.22	
Wt	5.00 EA	924	22	237	0	0	1,183	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En		263.84	2.51	209.44	0.00	0.00	475.79	
ds	10.00 EA	3,388	32	2,689	0	0	6,109	610.90
Bellows w/Int Sleeves&Ext Covers								
MIL PL 3" OD Snap-On Plastic Valve T		19.53	0.16	6.00	0.00	0.00	25.70	
ag	40.00 EA	1,003	8	308	0	0	1,320	32.99
Includes Insulation								
MIL PL NDT, X-Ray Welds of 3" Dia Pi		50.79	0.45	30.00	0.00	0.00	81.24	
pe	20.00 EA	1,304	12	770	0	0	2,086	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	5.00 EA	9,869	88	0	0	0	9,956	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	200.00 LF	1,220	8	317	0	0	1,546	7.73
w/Fire Retardant Jackets								

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 3" Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	20.00	EA	1,467	30	514	0	0	2,011	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di			61.16	0.56	56.88	0.00	0.00	118.60	
sc	20.00	EA	1,571	14	1,461	0	0	3,046	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer									
M MIL PL 3" Flg St Press Regul&Reducer			128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	10.00	EA	1,648	39	25,215	0	0	26,902	2690.19
Sgl Seat,Sprg Load Dir Act Diap									
M MIL PL 3" Twin Disc Type Check Valve			45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	10.00	EA	578	6	820	0	0	1,403	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T			25.39	0.21	18.68	0.00	0.00	44.29	
hrd	10.00	EA	326	3	240	0	0	569	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P			1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00	EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	200.00	EA	8,130	190	693	0	0	9,014	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	20.00	EA	869	7	1,123	0	0	2,000	99.99
TOTAL LATERAL PIPING	1.00	JOB	50,707	748	37,343	0	0	88,798	88797.73
2006.20.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	10.00	EA	2,375	56	5,000	0	0	7,430	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	2,375	56	5,000	0	0	7,430	7430.09
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	112,778	1,563	67,454	0	0	181,795	181794.80
2006.20.15.20. H2O REINJECTION SYSTEM									
MIL PL 4" (10cm) Galv Steel Pipe			8.98	0.09	9.10	0.00	0.00	18.16	
ASTM A-53, T&C, Sch 40	1500.00	LF	17,291	174	17,517	0	0	34,983	23.32
MIL PL 2-1/2" (60mm) Galv Steel Pipe			5.73	0.05	4.64	0.00	0.00	10.43	
ASTM A-53, T&C, Sch 40	500.00	LF	3,681	34	2,980	0	0	6,695	13.39

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4" 90 Degree Ell, 150# MI Gal			52.37	0.53	60.52	0.00	0.00	113.42	
v	10.00	EA	672	7	777	0	0	1,456	145.62
MIL PL 2-1/2"90 Degree Ell,150# MI G			36.70	0.34	20.80	0.00	0.00	57.84	
alv	10.00	EA	471	4	267	0	0	743	74.26
MIL PL 4" 45 Degree Ell, 150# MI Gal			52.37	0.53	69.20	0.00	0.00	122.10	
v	10.00	EA	672	7	889	0	0	1,568	156.78
MIL PL 2-1/2"45 Degree Ell,150# MI G			36.70	0.34	28.39	0.00	0.00	65.43	
alv	10.00	EA	471	4	365	0	0	840	84.00
MIL PL 4" Tee, Red Out 150# MI Galv			66.15	0.67	98.70	0.00	0.00	165.52	
	2.00	EA	170	2	253	0	0	425	212.52
MIL PL 4" Cap, 150# MI Galvanized			17.96	0.18	32.49	0.00	0.00	50.63	
	1.00	EA	23	0	42	0	0	65	65.00
MIL PL 2-1/2" Union, 150# MI Galvani			39.89	0.37	39.11	0.00	0.00	79.36	
zed	4.00	EA	205	2	201	0	0	408	101.90
MIL PL 2-1/2"Nipple,Galv Stl Sch 40,			12.23	0.11	8.79	0.00	0.00	21.13	
4"	10.00	EA	157	1	113	0	0	271	27.13
4"(10cm) Long									
MIL PL 4"Nipple,Galv Stl Sch 40, 4"			17.96	0.18	12.92	0.00	0.00	31.05	
4"(10cm) Long	10.00	EA	231	2	166	0	0	399	39.87
MIL PL 4" Screwed Flange,Galv (125#			71.83	0.72	17.49	0.00	0.00	90.04	
CI)	4.00	EA	369	4	90	0	0	462	115.62
MIL PL 2-1/2"Scrd Flange,Galv (125#			42.28	0.39	10.00	0.00	0.00	52.66	
CI)	4.00	EA	217	2	51	0	0	270	67.61
MIL PL 4"Coupling,Straight 150# MI G			52.37	0.53	50.70	0.00	0.00	103.60	
alv	10.00	EA	672	7	651	0	0	1,330	133.02
MIL PL 2-1/2"Coupling,Strt 150# MI G			36.70	0.34	19.04	0.00	0.00	56.07	
alv	10.00	EA	471	4	244	0	0	720	72.00

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	6.00	EA	244	6	21	0	0	270	45.07
AIR AA 4" Weldolet			158.30	3.70	7.20	0.00	0.00	169.21	
	20.00	EA	3,166	74	144	0	0	3,384	169.21
M MIL PL Pipe Support			57.13	1.18	20.00	0.00	0.00	78.31	
	150.00	EA	11,004	226	3,852	0	0	15,082	100.55
AIR AA 2 1/2" Weldolet			105.54	2.47	4.90	0.00	0.00	112.90	
	20.00	EA	2,111	49	98	0	0	2,258	112.90
TOTAL H2O REINJECTION SYSTEM	1.00	JOB	42,299	610	28,720	0	0	71,630	71629.65
2006.20.15.25. STEAM GENERATION SYSTEM									
USR AA Mechanical Subcontractor F&I			0.00	0.00	0.00	20000.00	0.00	20000.00	
Steam Generation System Pipin									
g	1.00	JOB	0	0	0	20,000	0	20,000	20000.00
TOTAL STEAM GENERATION SYSTEM	1.00	JOB	0	0	0	20,000	0	20,000	20000.00
2006.20.15.30. WATER TREATMENT SYSTEM									
USR AA Mechanical Piping & Hookup			0.00	0.00	0.00	150000.00	0.00	150000.00	
Treatment System	1.00	JOB	0	0	0	150,000	0	150,000	150000.00
TOTAL WATER TREATMENT SYSTEM	1.00	JOB	0	0	0	150,000	0	150,000	150000.00
2006.20.15.35. AIR PIPING									
MIL PL 2"(50mm) A-53 Pipe, Sch 40			4.83	0.04	2.13	0.00	0.00	7.00	
Not Incl Hangers or Fittings	2500.00	LF	15,499	142	6,837	0	0	22,478	8.99
MIL PL 1"(25mm) A-53 Pipe, Sch 40			3.21	0.03	1.02	0.00	0.00	4.25	
Not Incl Hangers or Fittings	1500.00	LF	6,178	57	1,956	0	0	8,190	5.46
MIL PL 2" 90 Degree ELL,150# MI Blac			24.79	0.23	6.25	0.00	0.00	31.27	
k	25.00	EA	796	7	200	0	0	1,004	40.15
MIL PL 1" 90 Degree Ell, 150# MI Bla			15.29	0.14	1.96	0.00	0.00	17.39	
ck	150.00	EA	2,945	27	378	0	0	3,349	22.33

2006.20. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1" Coupling, Strt 150# MI Bla			15.29	0.14	2.29	0.00	0.00	17.72	
ck	50.00	EA	982	9	147	0	0	1,138	22.75
MIL PL 2" Coupling, Strt 150# MI Bla			24.79	0.23	5.68	0.00	0.00	30.70	
ck	25.00	EA	796	7	182	0	0	986	39.42
MIL PL 1" Union, 150# MI Black			20.85	0.19	5.68	0.00	0.00	26.72	
	300.00	EA	8,031	74	2,188	0	0	10,293	34.31
MIL PL 2" Union, 150# MI Black			36.70	0.34	12.09	0.00	0.00	49.12	
	25.00	EA	1,178	11	388	0	0	1,577	63.07
MIL PL 1" Nipple, Black Stl Sch 40,			7.06	0.06	0.59	0.00	0.00	7.72	
4"	150.00	EA	1,359	12	114	0	0	1,486	9.91
MIL PL 2" Nipple, Black Stl Sch 40,			9.86	0.09	1.19	0.00	0.00	11.14	
4"	25.00	EA	317	3	38	0	0	358	14.31
MIL PL 2" Tee, Red Out 150# MI Galv			36.70	0.34	13.41	0.00	0.00	50.45	
	150.00	EA	7,067	65	2,584	0	0	9,716	64.77
MIL PL 1" Tee, Straight 150# MI Galv			20.85	0.19	3.66	0.00	0.00	24.70	
	150.00	EA	4,016	37	705	0	0	4,758	31.72
MIL PL 1"D Plug Valve, Semi-Stl,Scrd			28.22	0.24	29.42	0.00	0.00	57.88	
Lubricated,Wrench Oper w/Wren	150.00	EA	5,434	46	5,667	0	0	11,147	74.31
ch									
MIL PL 2"D Plug Valve, Semi-Stl,Scrd			50.79	0.43	31.31	0.00	0.00	82.53	
Lubricated,Wrench Oper w/Wren	10.00	EA	652	5	402	0	0	1,060	105.97
ch									
M MIL PL 1"Thrd St Press Regul & Red,I			59.06	0.53	356.42	0.00	0.00	416.00	
B	150.00	EA	11,374	101	68,645	0	0	80,120	534.14
Sgl Seat,Sprg Load Dir Act Diap									
MIL PL 1" ID Hose x 1-1/4" MPT			13.74	0.07	0.82	0.00	0.00	14.63	
Serrated Shank Nipple	150.00	EA	2,646	14	158	0	0	2,818	18.79
TOTAL AIR PIPING	1.00	JOB	69,268	618	90,591	0	0	160,476	160476.31
TOTAL PIPING	1.00	JOB	477,605	7,658	316,937	170,000	0	972,200	972200.45
TOTAL TREATMENT SYSTEM CONSTRUCTION	1.00	JOB	571,092	8,112	1,093,374	1,342,950	0	3,015,528	3015528.04

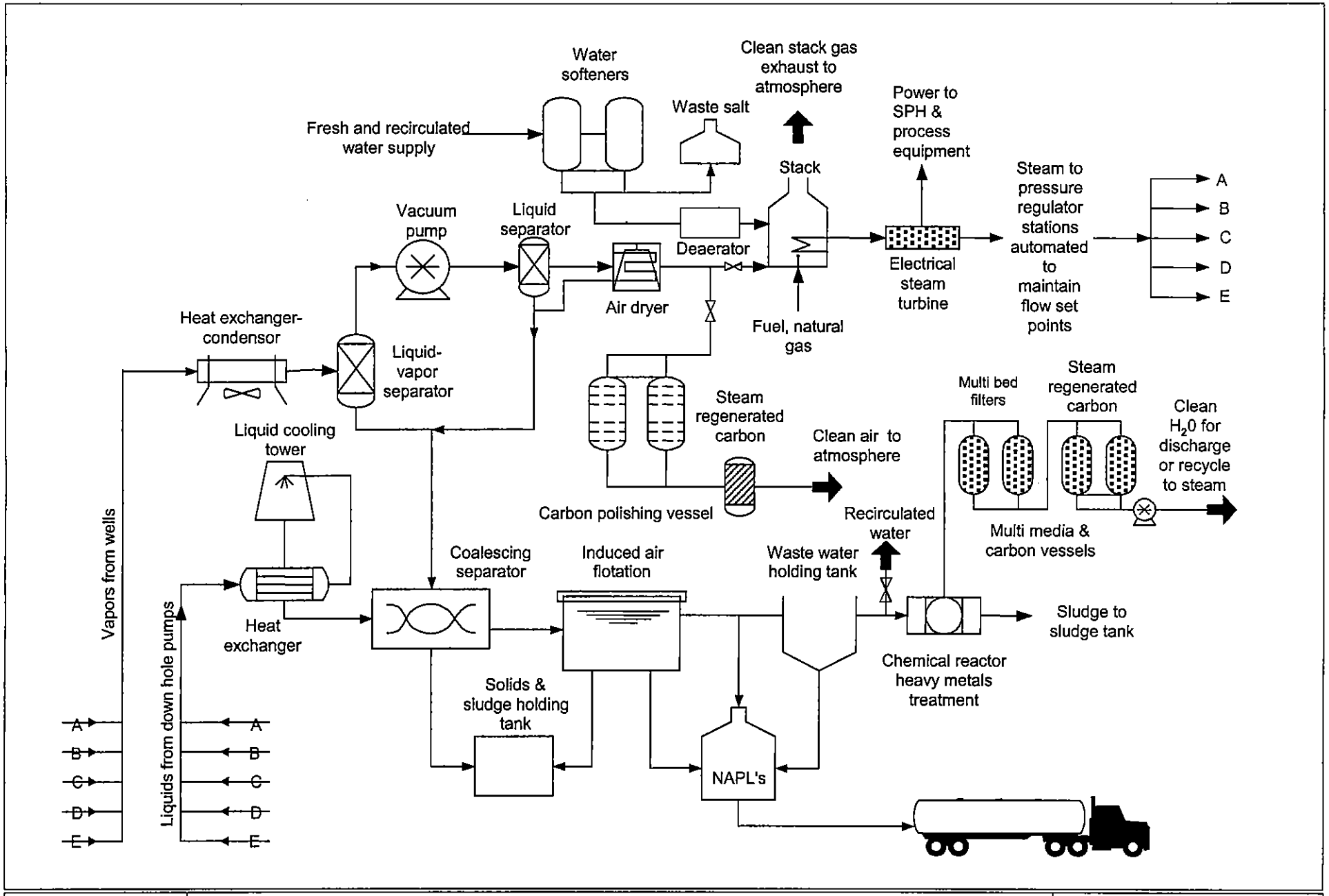


Figure 4-1
Surface Process Diagram

THERMAL TREATMENT TECHNOLOGY
CONCEPTUAL DESIGN
McCormick and Baxter Superfund Site
Stockton, California

Table 4-1
Maximum Injection Pressures for Different Depth Zones

	A	B	C	D	E
Depth to top of injection screen (ft)	25	60	125	155	240
Injection pressure (psig)	12.5	30	63	78	107

Table 7-2
Definition of Zones, Depths, Volumes, and Energy Demand for Phasing Alternative of Scenario 1

	Scenario 1	Step 1	Step 2	Step 3	Step 4	Unit	Comment
Thermal treatment depth	0-260	190-260	145-260	40-260	0-260		
Area affected	MPA,CPA,N-MPA	MPA,N-MPA	MPA,N-MPA	MPA,CPA	MPA,CPA		
Steam into aquifers	A,B,C,D,E	E	D,E	C,D,E	A,B,C,D,E		
Extraction in aquifers	A,B,C,D,E	D,E	C,D,E	A,B,C,D,E	A,B,C,D,E		Plus aquitards between aquifers
Duration of steam injection	4	3	3	3	3		
Duration of ERH	2	3	0	0	0		
Total volume heated	1,541,900	296,287	535,965	1,234,157	1,541,900	yd^3	
Total soil mass	2.29E+09	4.39E+08	7.95E+08	1.83E+09	2.29E+09	kg	
Total BTU need w/losses	2.61E+12	5.02E+11	9.08E+11	2.09E+12	2.61E+12	BTU	
Heat-up BTU need	4.04E+11	7.76E+10	1.40E+11	3.23E+11	4.04E+11	BTU	

Table 7-3
Estimation of Bulk Volume and Sand Fractions in Priority Treatment Zones

Zone/area	Area (ft^2)	Top (ft)	Btm (ft)	Depth (ft)	Volume (yd^3)	Scenario 1	Step 1	Step 2	Step 3	Step 4	
MPA	17,695	0	-120	120	78,651	78,651	0	0	78,651	78,651	yd^3
	28,419	0	-180	180	189,475	189,475	0	36,842	147,370	189,475	yd^3
	74,247	0	-260	260	715,028	715,028	192,508	316,263	605,024	715,028	yd^3
	19,398	-25	-260	235	168,848	168,848	50,295	82,628	158,070	168,848	yd^3
CPA	97,739	0	-80	80	289,620	289,620	0	0	144,810	289,620	yd^3
N-MPA	11,097	-30	-120	90	36,993	0	0	0	0	0	yd^3
	9,538	-30	-180	150	52,993	12,365	0	12,365	12,365	12,365	yd^3
	20,628	-30	-260	230	175,734	87,867	53,484	87,867	87,867	87,867	yd^3
Total volume					1,707,343	1,541,854	296,287	535,965	1,234,157	1,541,854	yd^3
Volume under active heating							296,287	535,965	937,870	709,603	yd^3
Projected steam injection demand based on volume							20	36	63	48	MM BTU/hr
Estimated steam injection rate based on heatup calculations							23	27	50	41	MM BTU/hr
Design steam injection rate for step							25	25	45	45	MM BTU/hr

Table 7-4
Summary of Design Parameters for the Four Steps

	Volume treated (yd3)	Steam rate (lbs/hr)	Liquid extraction rate (gpm)	Vapor extraction rate (scfm)	Injection wells (number)	Extraction wells (number)	Monitoring and NAPL wells (number)
Step 1	296,000	25,000	150	100	10	29	11
Step 2	536,000	25,000	150	100	45	88	21
Step 3	1,235,000	45,000	350	350	58	170	35
Step 4	1,540,000	45,000	350	700	165	170	48

Table 7-5
Summary of Liquid Extraction Rate Calculations for Phasing Alternative of Scenario 1

	Scenario 1	Step 1	Step 2	Step 3	Step 4	
Steam demand, 180 d heat-up	104	25	25	45	45	MM BTU/hr
Equivalent water injection rate, 180 d heat-up	187	46	54	100	82	gpm
Minimal water extraction rate, 150% of injected rate	280	75	75	135	135	gpm
Minimal net extraction rate from ICF Kaiser Alternative 4	235	51	73	117	235	gpm
Total liquid extraction rate needed	422	126	148	252	370	gpm
Estimated miscellaneous water usage	40	10	20	30	40	gpm
Total effluent treatment system size	462	136	168	282	410	gpm
Design rate	475	150	150	350	350	gpm

Table 7-6
Sizing of Vapor Extraction System for Phasing Alternative of Scenario 1

	Scenario 1	Step 1	Step 2	Step 3	Step 4	Unit
HPO co-injection	1	1	1	1	1	% air/steam
Steam rate	100,000	25,000	25,000	45,000	45,000	lbs/hr
Air injection rate	1,000	250	250	450	450	lbs/hr
Air injection rate	240	60	60	108	108	scfm
Minimium extraction rate	360	90	90	162	162	scfm
Area	268	0	0	100	268	1000 ft^2
Estimated infiltration rate	2	2	2	2	2	scfm/1000ft^2
Infiltration rate	536	0	0	200	536	scfm
Total air extraction rate	896	90	90	362	698	scfm
Design rate	1,000	100	100	350	700	scfm

Table 7-7
Sizes and Capacities of Major Effluent Treatment System Components for Phasing Alternative of Scenario 1

Component	Parameter	Scenario 1	Step 1	Step 2	Step 3	Step 4	Unit	Comment/assumption
Vapor phase liquid separator 1	Air flow rate	4,733	534	611	1,280	1,474	scfm air	Non-condensable gas plus 10% of injected steam as condensate
	Liquid flow rate	22	8	8	18	18	gpm condensate	Assuming max 5% of liquid extracted with vapor stream
Liquid phase heat exchanger	Liquid flow rate	435	150	150	350	350	gpm water	Maximum rate
	Cooling capacity	22	7	7	17	17	MM BTU/hr	Assumed 100 F cooling
Vapor phase heat exchanger/condensor	Cooling capacity	12	3	3	6	5	MM BTU/hr	0% of injected energy as steam and energy in 200F condensate
Vapor phase liquid separator 2	Air flow rate	1,000	100	100	350	700	scfm air	
	Liquid flow rate	23	6	7	12	11	gpm condensate	Based on maximum vapor phase cooling capacity
Vacuum pumps	Air flow rate	1,000	100	100	350	700	scfm	
	Vacuum	-10	-10	-10	-10	-10	psig	Need to apply vacuum
Vapor treatment units	Air flow rate	1,000	100	100	350	700	scfm	
Water surge tank	Retention time	1	1	1	1	1	hours	Need settling and separation time for solids and NAPL
	Minimum capacity	26,100	9,000	9,000	21,000	21,000	gallons	
Dissolved Air Floatation	Water flow rate	435	150	150	350	350	gpm	
	NAPL flow rate	11	4	4	9	9	gpm	Assumed max NAPL ratio of 2.5% of total water flow
Multimedia filters	Water flow rate	475	170	170	350	350	gpm	DAF flow rates plus process water
Water treatment unit (GAC)	Water flow rate	475	170	170	350	350	gpm	DAF flow rates plus process water
NAPL holding tanks	Capacity	21,000	21,000	21,000	21,000	21,000	gallons	Tanks added and emptied for disposal as needed
	Minimum number	2	2	2	2	2	#	Empty backup tank on-site

Table 7-8
Utility Demand for Phasing Alternative of Scenario 1

	Scenario 1	Step 1	Step 2	Step 3	Step 4	Unit	Comment
Fresh water demand	200	50	60	100	85	gpm	
ERH power	2,550	1,000	0	0	0	kW	DE ERH in Step 1
Process power	1,000	500	500	700	700	kW	Increases with vacuum extraction rate
Power demand	3,550	1,500	500	700	700	kW	
Gas firing rate	152,381	33,956	39,971	72,757	60,538	scfh	80% firing rate in average

"Steve Carroll" <carroll@steamtech.com>

07/02/01 09:22 AM

To: Harry_Ehlers@URSCorp.com
cc:
Subject: RE: angled drilling at McCormick and Baxter site

Good Morning Harry,

further to our telephone conversation of Friday afternoon, I have made some enquiries and found that San Francisco - Sacramento area environmental drilling contractors typically had doubts about drilling to depths of 300 feet at the angles of interest. On the face of it, this might require some changes to the design, possibly with additional, deeper, drilling from a barge in the slough.

I am assured by Patrick Langan (775-246-0296) of Boart Longyear in Dayton, NV, that they would anticipate no difficulty in drilling to these depths at angles as low as 45 degrees using rotary or sonic rigs with down-hole casing advance and that 4 or 6-inch casing and screen could be installed. You may wish to talk to him.

Let me know if I can be of any assistance.

Steve Carroll

(661) 322 6552 Fax
(908) 653-1313 Fax

June 12, 2001

John E. Spear
URS Corporation
12 Commerce Drive
Cranford, NJ 07016-1101

Tim Cechini
Lane Christiansen
Fontana, CA

Re: McCormick and Baxter Superfund Site
Stockton, CA
Drilling Pricing

Dear Tim:

As we discussed in early May we need budget pricing for the drilling and installation of wells at the referenced site. We are working on an Engineers estimate for the Feasibility of this option under contract with the USACOE.

The pricing could be broken down in the following unit prices:

		Unit Price
1. Drilling wells, 12" dia. (288 Wells) These are extraction and injection wells with 6" casing/screens all Stainless Steel. Note that 15 of these wells will be drilled off barge in the Old Mormon Slough. Also 15 of these wells will be drilled at an angle from the bank under the Slough.	36,851 LFT	135 00/ft
2. Install URS furnished Electrodes These electrodes will go in the bottom of some of the 288 wells drilled above.	44 EA	450 00/each
3. Install URS furnished Extraction Pumps	124 EA	725 00/each
4. Install URS furnished Thermocouples These thermocouples (VEA's) will be installed in 4" dia holes and grouted solid. Total drilling for these 38 will be 8,560 vertical feet.	ave 40 00/lft → 38 EA	9000 00/each
5. 12" Protective Case and Well head up to flange	288 EA	250/well
6. Install URS furnished Down Hole Instruments	288 EA	450 00/each
7. Well Development 288 Extraction and Injection wells. Monitoring wells below.	288 EA	1000 00/each
8. Pump tests	4 EA	6,300 00/well

Extraction Well
pumps 725 00
Level 450
Temp 450
1625

9. Monitoring wells (39 each with 4" SS Piping/Screens) 5,580 LFT 100/ft
Complete including drilling, developing, piping, locking caps,

All wells above would include packing, grout etc required in ea. Well.

If you have any questions please call me in my NJ office at 908-653-3154 or 908-653-1300. My fax number in NJ is 908-653-1313.

Cordially,

John E. Spear

[redacted]

BPeake@qedenv.com

06/21/2001 10:49 AM
AST

To:john_spear@urscorp.com
cc:MParker@qedenv.com, telecorder@aol.com
bcc:
Subject:Budget Pricing

Jack

You are working on a very interesting project. Hopefully your proposal proves to be

QED provided a large dedicated groundwater sampling system at the McCormick Baxter s

Please let us know how things progress and if you need any additional information.

Thank you

Brad Peake
Regional Sales Manager
Severn Trent/ QED Environmental Systems
800-624-2026
bpeake@qedenv.com

(See attached file: McCormickBaxterSteam.xls)

McCormickBaxterSteam.xls	**Type:** application/msexcel **Name:** McCormickBaxterSteam.xls

Item	Description	Quantity	Unit Price	Extended Price	
1	HammerHead Pump, bottom load, high temp, Stainless	163	2500	$ 407,500.00	
2	HammerHead Pump, top load, high temp, Stainless	20	2700	$ 54,000.00	
3	Air Compressor, Rotary Screw, NEMA 4, 600 scfm, 125 HP	1	40000	$ 40,000.00	
4	Flexible discharge tubing, pump to piping manifold	14000	11	$ 154,000.00	
5	Air supply tubing, pump to wellhead, stainless steel	14000	6	$ 84,000.00	
6	Pulse Counter with output 4-20 ma signal	163	395	$ 64,385.00	
7	Liquid level measurement, portable magnahelic	1	1000	$ 1,000.00	
7a	Downwell liquid level bubbler tube	14000	2	$ 28,000.00	
8	Spare parts for 163 HammerHead pumps (7 years)	7	6000	$ 42,000.00	
				$ 874,885.00	
	Prices are budgetary and not intended to be final. Pricing				
	does not include freight or any applicable sales or use tax.				

HammerHead™

H4 Series (wells 4" & up)

INSTALLATION & OPERATION MANUAL

Models H45SSB, H45SEB, HF45SSB, HF45SEB, H45SET, HF45SET and HF43SET

HAMMERHEAD
CLEANUP PUMPS

QED GroundWater Specialists®
P.O. Box 3726 Ann Arbor, MI 48106 USA

Part No. 95067
REV.#2 1-2-95

HAMMERHEAD™ CLEANUP PUMPS

HammerHead™ H4 Series pumps (patent pending) are high-rate, air-driven pneumatic pumps primarily useful for total fluids applications. They run automatically, with the Hammer Drive magnetic relay and internal float system. The system senses liquid level in the pump, turning the air supply on when the pump is full, and turning it off as soon as the pump empties.

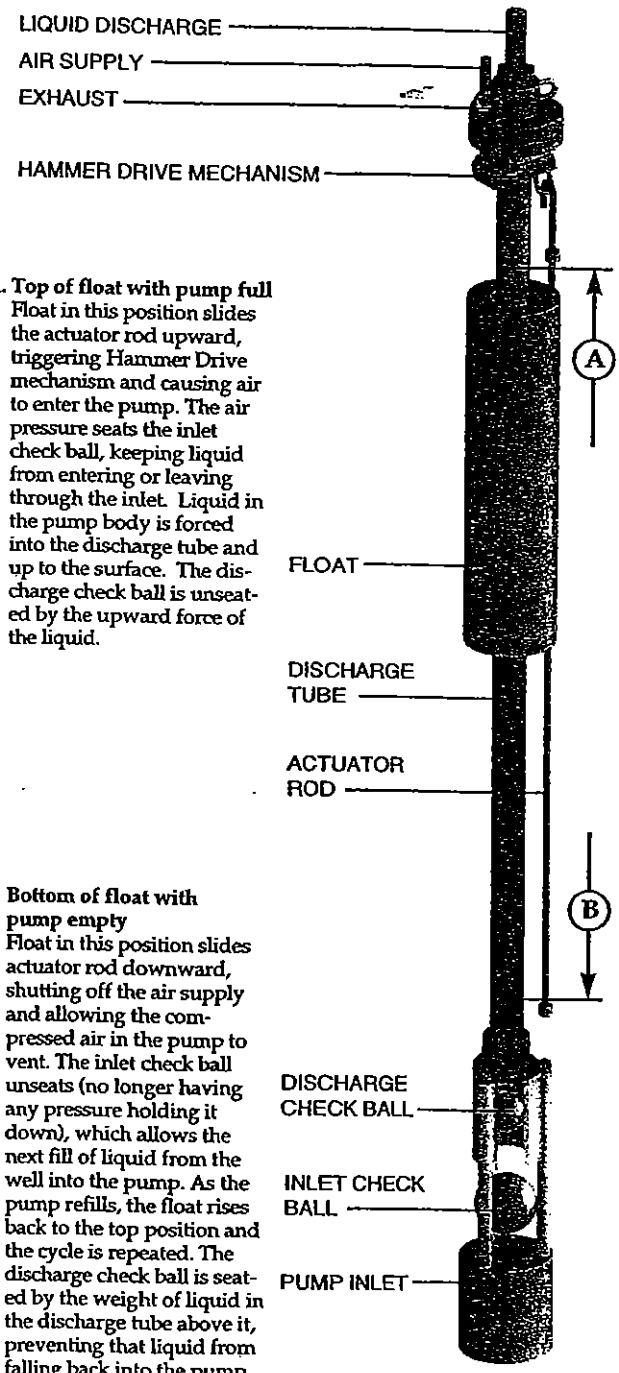
With built-in control, a HammerHead pump doesn't require air cycle timers or on-off level controls at the wellhead, simplifying system design. System setup is easy—just run air to each well. Continued operation is truly hands-off. The pump constantly reacts to changes in well yield, so it always pumps at the highest rate possible, and shuts down automatically when the well drops below pumping level. (NOTE: H4 Series pumps require a minimum of 3.5 feet of liquid above the bottom of the inlet in order to run.)

Because cycling is controlled downwell, a HammerHead pump is either refilling or discharging 100% of the time. There's no waiting between active phases of the cycle for the entire length of air supply tubing to re-pressurize. This operating efficiency enables H4 Series pumps to deliver maximum flow rates of more than 11 gallons per minute while also saving on air supply requirements. It also keeps air out of the liquid discharge system, preventing over-pumping, foaming, and emulsification.

The HammerHead pumping mechanism uses the same high-clearance design and stay-clean ball check valves that set the PULSE PUMP® standard for field performance without clogging or breakdowns. All parts, including the Hammer Drive system, are easily field serviceable.

HOW THE HAMMERHEAD PUMP WORKS

- An H4 Series pump requires a minimum depth of 42" of liquid (measured from the bottom of the pump) to begin pumping.
- The pump automatically shuts off when the liquid level is pumped down below this level, and will automatically begin pumping again once well level has recovered.



A. Top of float with pump full
Float in this position slides the actuator rod upward, triggering Hammer Drive mechanism and causing air to enter the pump. The air pressure seats the inlet check ball, keeping liquid from entering or leaving through the inlet. Liquid in the pump body is forced into the discharge tube and up to the surface. The discharge check ball is unseated by the upward force of the liquid.

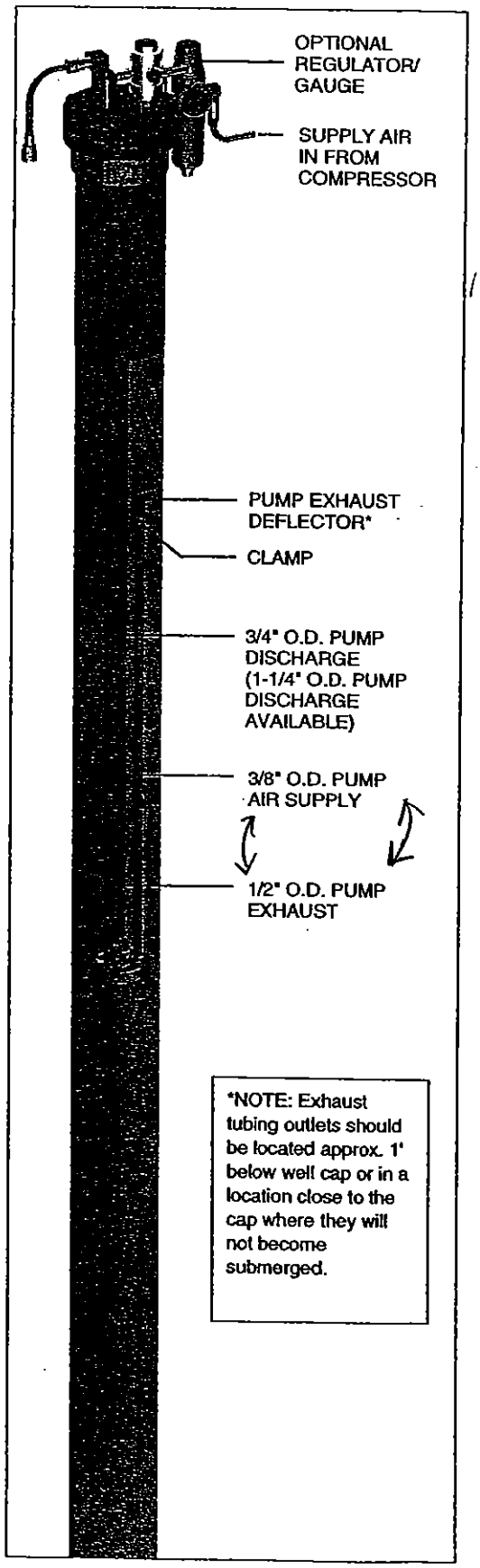
B. Bottom of float with pump empty
Float in this position slides actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (no longer having any pressure holding it down), which allows the next fill of liquid from the well into the pump. As the pump refills, the float rises back to the top position and the cycle is repeated. The discharge check ball is seated by the weight of liquid in the discharge tube above it, preventing that liquid from falling back into the pump body.

H4 SERIES SPECIFICATIONS

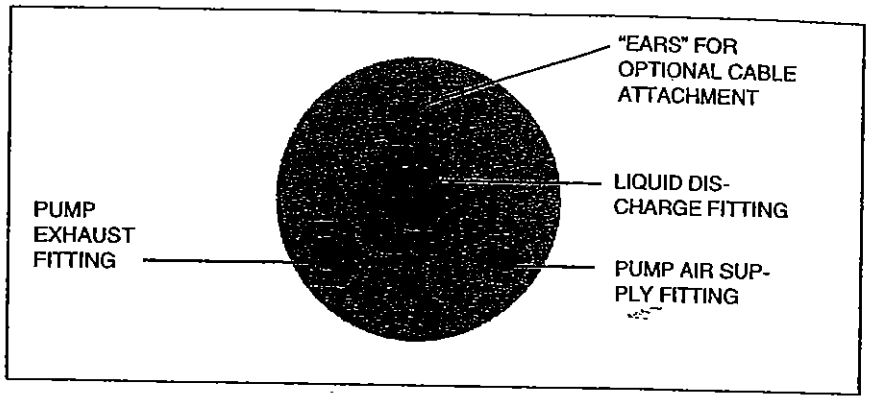
	H4 Series Bottom Inlet	H4 Series Top Inlet	Short H4, Top Inlet
Model No.	H45SSB, H45SEB, HF45SSB, HF45SEB	H45SET, HF45SET	HF43SET
Pump Type	Positive Air Displacement	Positive Air Displacement	Positive Air Displacement
Inlet	Bottom	Top	Top
O.D.	3.5" (89 mm)	3.5" (89 mm)	3.5" (89 mm)
Length	55" (140 cm)	60" (152 cm)	42" (105 cm)
Weight	23.5 lbs. (10.7 kg)	24.0 lbs. (10.9 kg)	16.0 lbs. (7.3 kg)
Materials	Stainless steel construction, with Teflon® inlet and discharge check balls, stainless steel or epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon® inlet and discharge check balls, epoxy float, Viton O-rings,
Fittings: Type*	Barb	Barb	Barb
Sizes: Liquid Discharge	3/4" (19 mm) O.D. (H45SSB, H45SEB) or 1-1/4" (32 mm) O.D. (HF45SSB, HF45SEB)	3/4" (19 mm) O.D. (H45SET) or 1-1/4" (32 mm) O.D. (HF45SET)	1 1/4" (32 mm) O.D. Tube
Air Supply	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing
Exhaust	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing	1/2" (13 mm) O.D. Tubing
Pump Stroke	0.8 gal. (2850 ml.)	0.8 gal. (2850 ml.)	0.32 gal. (1200 ml.)
Operating pressure range	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)	10-100 psi (70- 695 kPa)
Maximum lift	300 ft. (90 m)	300 ft. (90 m)	200 ft. (60 m)
Maximum flow rate	14+ GPM (54+ LPM) HF45SSB, HF45SEB	11+ GPM (41+ LPM) HF45SET	10 GPM (38 LPM)
Minimum submergence	42" (107 cm) above pump bottom	Top Inlet Port— 58" (147 cm) above bottom of pump	Top Inlet Port— 38" (97 cm) above bottom of pump
Density of pumped liquid	1.0 g/cc (stainless float); 0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)	0.7 g/cc up (epoxy float)
Cap sizes**	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)

* Note: Pumps are available with tubing or hose; quick disconnect fittings are available on request.

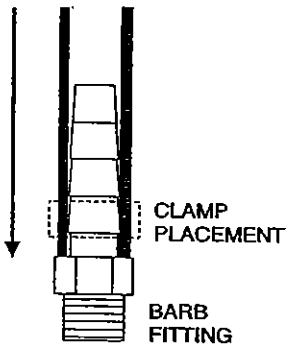
** Special caps available.



*NOTE: Exhaust tubing outlets should be located approx. 1' below well cap or in a location close to the cap where they will not become submerged.



STEP 1. Attach Tubing to Pump



A. Cut back sheathing on tubing set approximately 1 foot.

B. Slip clamps over appropriate tubes prior to connecting to barbs.

C. Push tubing down flush with the fitting's nut if possible; cover at least 3 barbs if 3 or more are present. (Note: in freezing weather, this is easier if tubing is dipped in warm water for a few seconds to soften the nylon.)

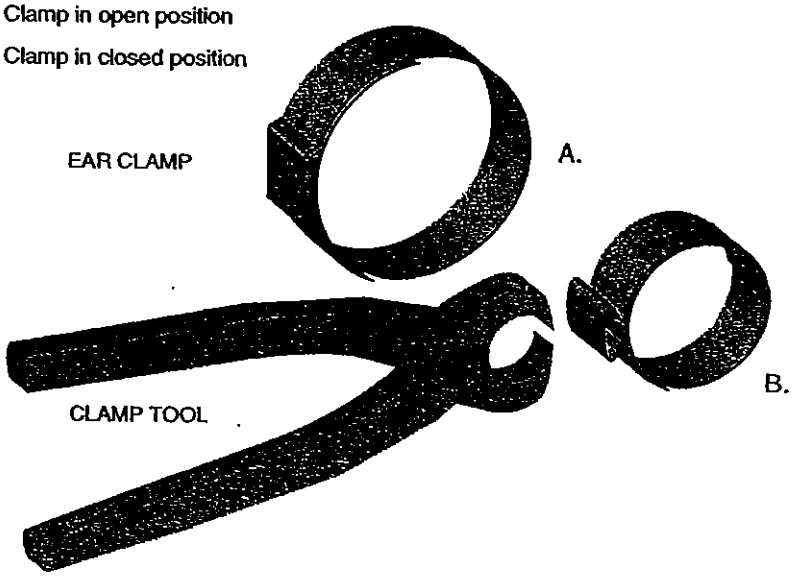
D. Place clamp over lowest barb completely covered by tubing.

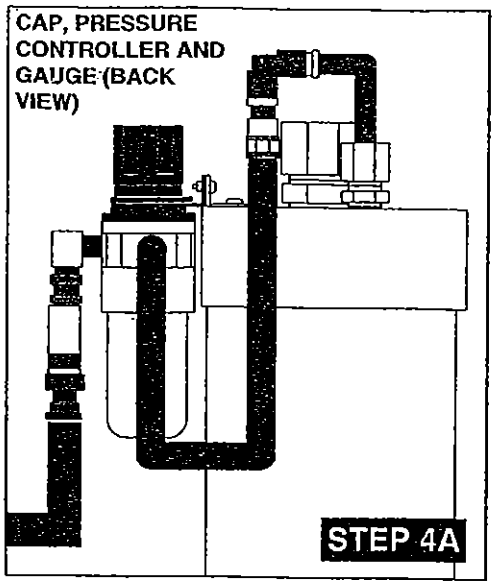
STEP 2. Tighten Clamps

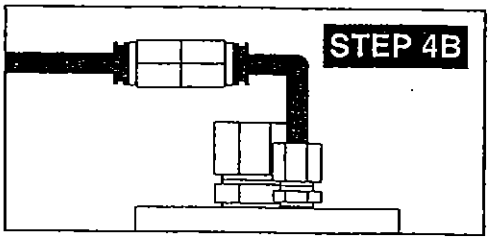
A. Place clamp tool over the dimpled ear portion of the clamp and squeeze ear together (as shown).

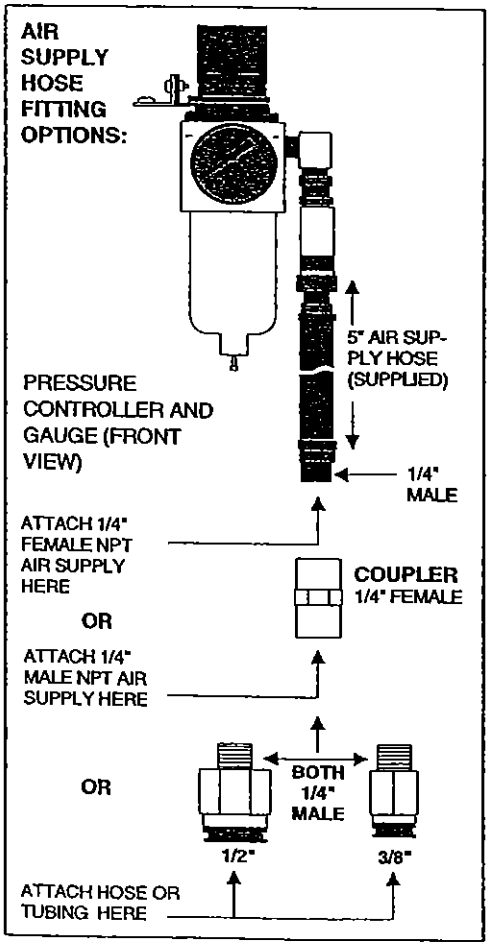
A. Clamp in open position

B. Clamp in closed position









STEP 3. Install Pump in Well

A. Lower pump to desired depth.

B. Once pump depth has been determined, measure off approximately 1 ft. of tubing length (measured from the top of well casing) from the pump exhaust line.

C. Cut exhaust line.

D. Attach the pump exhaust deflector to the pump exhaust line. (See clamp instructions in step 2.)

E. Pass pump discharge and air supply lines through the well cap: place well cap on casing.

F. Re-adjust pump to desired depth.

G. Cut air supply and discharge tubes to desired length.

H. Tighten fittings down onto air/discharge lines, and tighten well cap clamp if present.

STEP 4. Connect Air Supply and Discharge

A. If optional pressure regulator is used, connect short (≈1 foot) hose from regulator to pump air supply line with attached push-on elbow; attach 5' flexible hose to quick-connect fitting on regulator and to air supply line from compressor. See illustration at lower left for air supply hose fitting options.

OR

B. If optional pressure regulator is not used, connect air supply line from compressor directly to pump air supply line above well cap (fittings and coupler for 3/8" and/or 1/2" connections).

C. Connect pump discharge tube to discharge header. (Barb and clamps supplied with pump.)

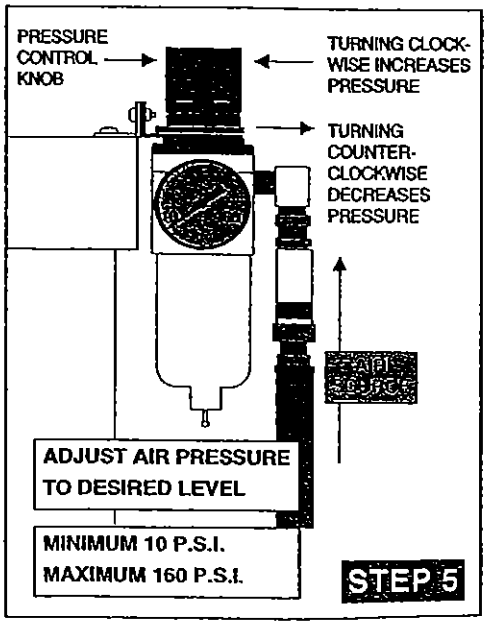
STEP 5. Set Air Pressure

NOTE: Flow Rate is dependent on the amount of air pressure that is received by the pump. Flow rates can be increased by increasing air pressure to the pump or decreased by decreasing air pressure to the pump. For satisfactory performance, pressure should be set at or above 1 psi for every 2 feet of total discharge head—i.e., a pump with T.D.H. of 200' would require 100 psi or more to pump effectively.

A. Adjust air pressure to desired level at compressor—minimum 10 psi, maximum 160 psi.

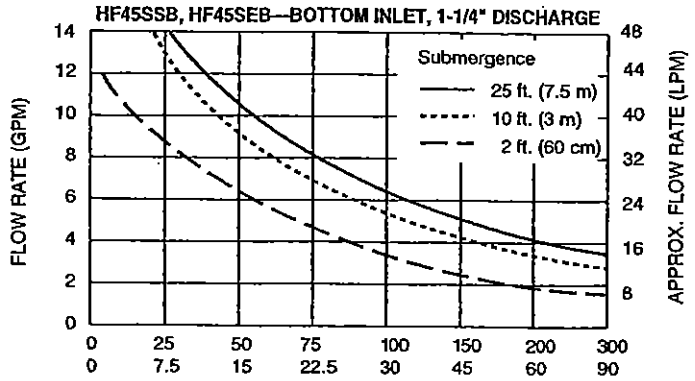
OR

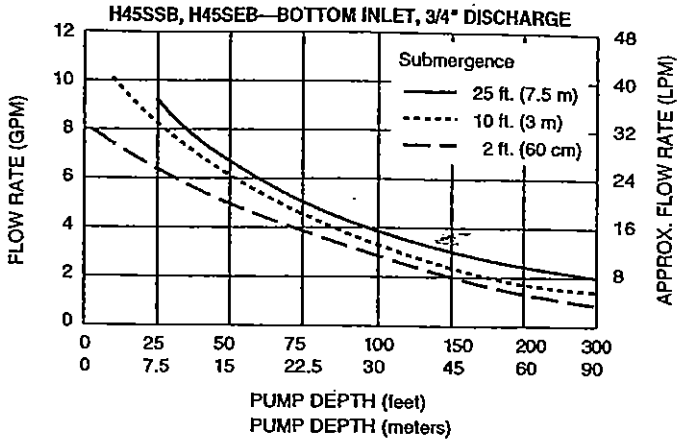
B. Adjust air pressure with optional pressure regulator (see illustration).

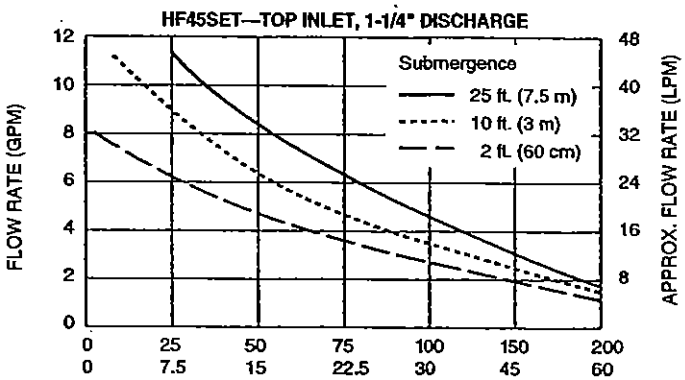


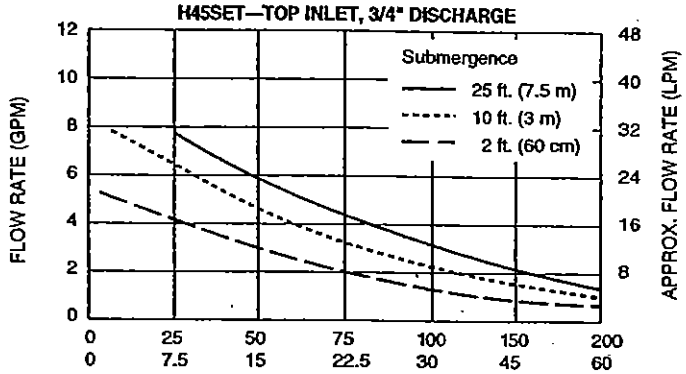
H4 SERIES FLOW PERFORMANCE CURVES

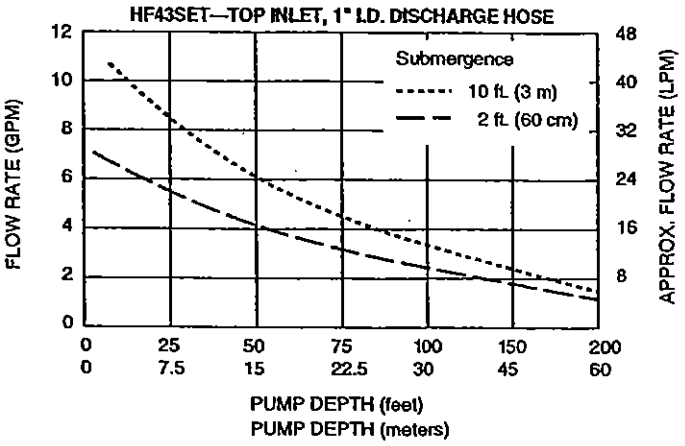
*100 psi (700 kPa) drive air pressure was supplied for all pump depths less than 150 feet (45 meters); 160 psi was supplied for all pump depths greater than 150 feet.











NOTE: Pump depth is measured down from the top of the well casing to the top of the pump fittings. Submergence is measured up from the lowest inlet point on the pump inlet to the top of the static water or product in the well.

~~IP~~	~~A~~	Max Pump rate
1 1/4"	= 1.6	12
3/4"	= 0.5	8.
1/2"	= 0.25	~4 ?

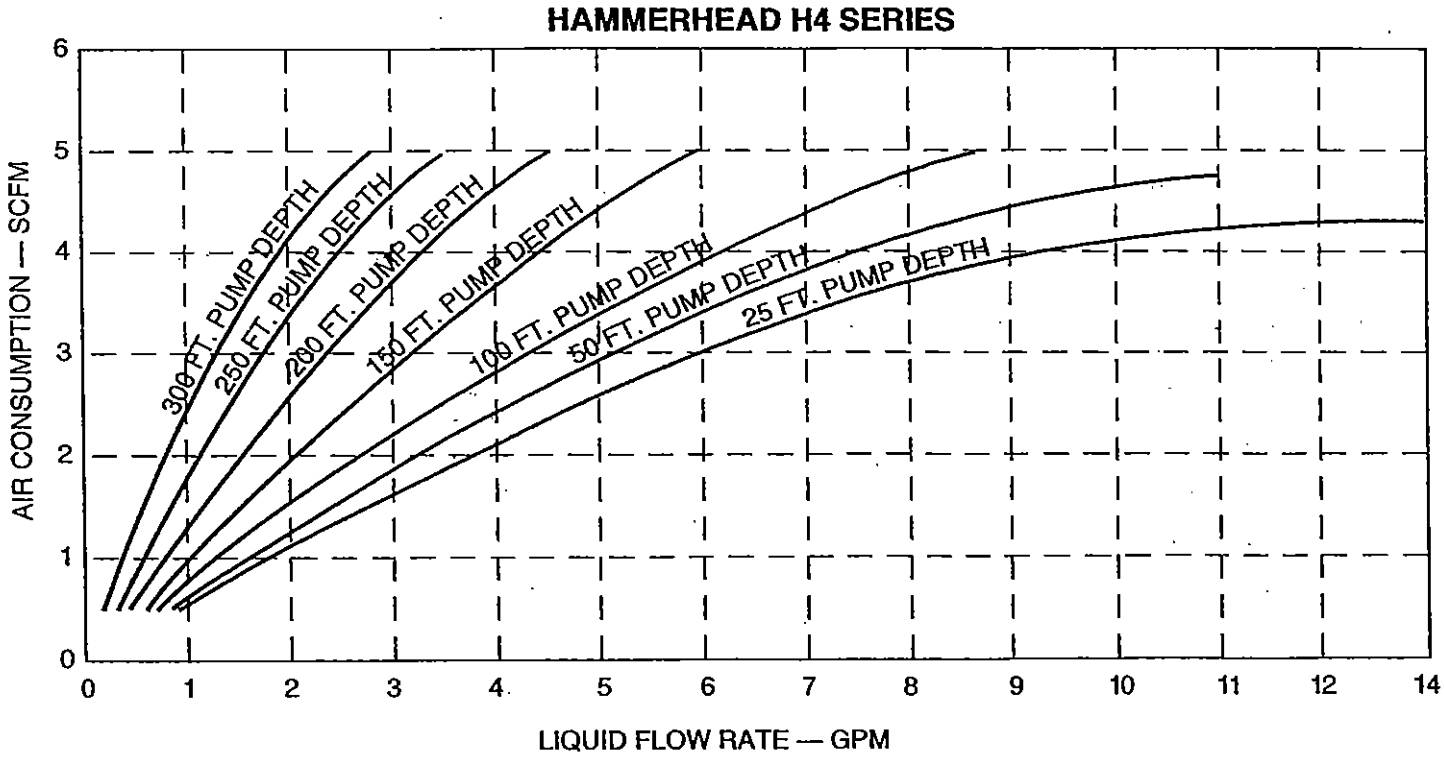
ACCESSORIES

MODEL	PUMP MODEL	DESCRIPTION
37000	All Models	Pump Cycle Counter (for Flow Totalization)
L374	All Models	Tank Full Shutoff
37050	All Models	Kit - Regulator/Gauge
KIH4ST	All Bot. Inlet mod.	Kit - Top Inlet Conversion - H4
KIH4SB	All Top Inlet mod.	Kit - Bottom Inlet Conversion - H4
CH52	All Bot. Inlet mod.	Can - 2' (60 cm) Length (Leachate)
95067	All Models	HammerHead O&M Manual
SPTOOLS	All Models	Clamp Tool, Tube Cutter

MODEL	PUMP MODEL	DESCRIPTION
37058	All Models	Kit - Cable Attachment
37060	All Models	Cable - 3/16" (5 mm) S.S. - order by ft.
37207	All Models	Rope - 3/8" (9 mm) Polypro. - order by ft.
37212	All Models	Cable Sling Assembly
37216	HF4 Series	* Hose - 1" (25 mm) I.D. Discharge (Black)
37217	HF4 Series	* Hose - 3/8" (9 mm) I.D. Air Supply (Red)
37218	HF4 Series	* Hose - 3/8" (9 mm) I.D. Exhaust (Gray)
37208	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Pump
37209	HF4 Series	Kit - Quick Connect - Discharge/Air Supply - Well Top
36824	All Models	Flow Throttle Valve

* Hose to be sold with quick connects only

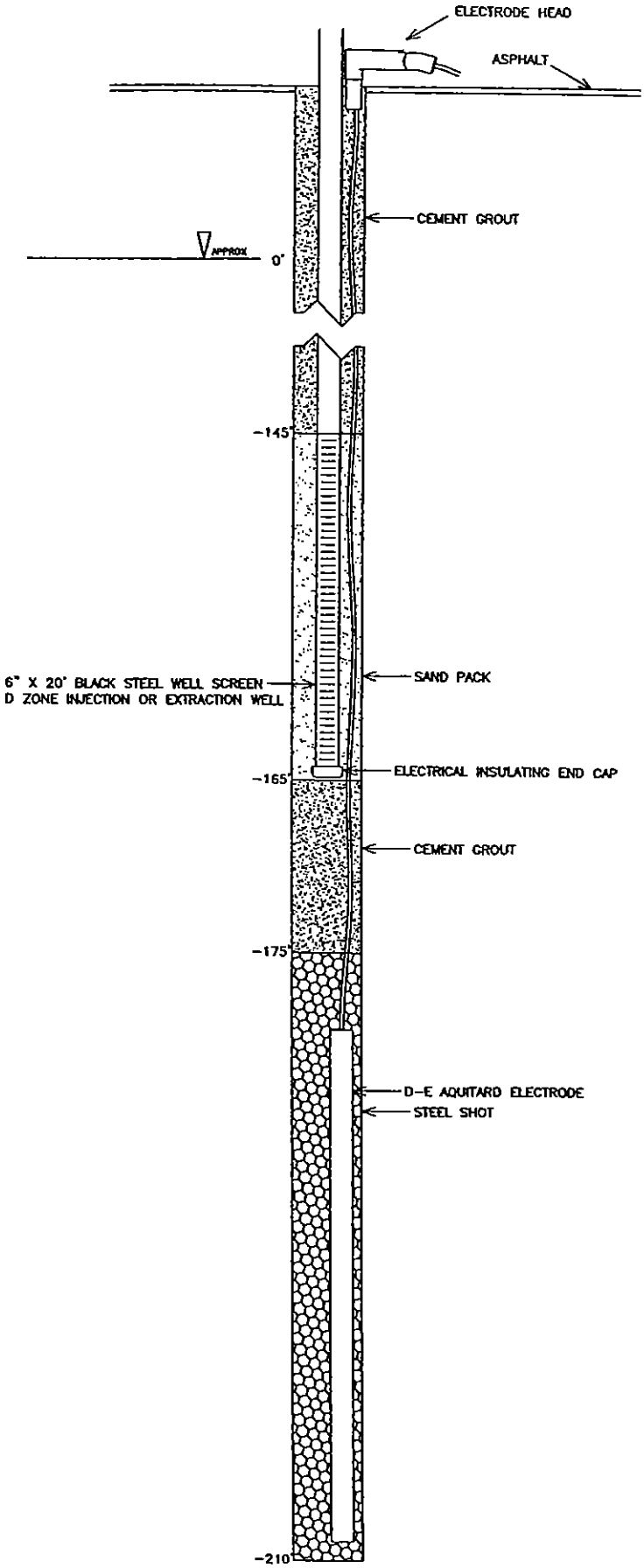
AIR CONSUMPTION



IMPORTANT — AIR FLOW IS ACTUAL. A MAXIMUM "ON-TIME" DUTY CYCLE FOR THE COMPRESSOR MUST BE CONSIDERED IN SELECTING A COMPRESSOR CAPACITY.

MINIMUM AIR FLOW REQUIRED 0.5 SCFM @ 10 PSI
MAXIMUM AIR PRESSURE 160 PSI

HANDOUT #4


ELECTRODE HEAD
ASPHALT
CEMENT GROUT
APPROX
0'
-145'
6" X 20' BLACK STEEL WELL SCREEN
D ZONE INJECTION OR EXTRACTION WELL
SAND PACK
-165'
ELECTRICAL INSULATING END CAP
CEMENT GROUT
-175'
D-E AQUITARD ELECTRODE
STEEL SHOT
-210'

6/20/01

To: Brad Peake QED

From: Jack Spear URS c/o Steamtech (Bakersfield)

12 Commerce Dr.
Cranford, NJ 07016
email: john_spear@urscorp.com

Please quote "budget" pricing for pumps & misc. on next page.

Call if you need.

Bakersfield till 6/21/01 661-322-6478
Cranford after 24th : 908-653-3154

Jack

Brad Peake 800-624-2026

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
1	H4 Hammerhead Pump (bottom loading)	163 EA		
2	H4 Hammerhead Pump (top loading)	20 EA		
4	Air Compressor 600 scfm w/dryer	1 EA		
5	Flexible Tubing (Connection well head to Piping Manifold)	183 EA		
6	Air Tubing (pump to well head) Stainless Steel	14000 LFT		
7	Pulse Counter w/output 4-20 ma signal	163 EA		
8	Pressure transducer w/bubbler probe (ss probe & 1/4" tube) (include line to vacuum to record dif. Press.)	163 EA		
9	Spare parts for 7 years operation	1 ls		

Note: Temperatures in well to 200 deg. F

Bryan Root in Ann Arbor 6/20/01

McCORMICK & BAXTER
STOCKTON, CA
6/20/2001

EXTRACTION PUMP TAKEOFF

ITEM	DESCRIPTION	QTY	UNIT PRICE	TOTAL
	1 H4 Hammerhead Pump (bottom loading)	163 EA		
	2 H4 Hammerhead Pump (top loading)	20 EA		
	3 Control Panel for up to 205 pumps not needed	1 EA		
	4 Air Compressor 600 cfm needed	1 EA		
	5 Flexible Tubing (Connection well head to ~~Header~~ Manifold at surface)	183 EA		
SS	6 Air Tubing (pump to well head) ~~standard good for 180°F~~	LFT		
	7 Pulse Counter w/output 4-20 ma signal	1 EA		

travel up to 1/4 mile to PLC

8. Level Controller — would use if want to maintain pull pump to level. do have surface pressure transducer with bubbler probe.

9. No electrical wiring at all

down well SS probe
1/4" SS tube to bubbler probe
line to vac
line to compressor to bubbler
reads air back press

Local Rep will call
David Courter QED – San Diego – 760-247-6305 hm. of c.

Send to Ann Arbor Fx# 734-995-1170

Attn Brad ~~Peek~~ Peake (Reg Sales Manager)

Dave Corder # telecorder@aol.com
send email

Harry Ehlers
06/14/01 09:10 AM

To: John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: Costs for ERH

Jack, I received this from Greg Beyke today.

Harry Ehlers, Project Engineer
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101-1616
Harry_Ehlers@urscorp.com
206/438-2700 (office)
206/438-2699 (fax)

---- Forwarded by Harry Ehlers/Seattle/URSCorp on 06/14/01 09:12 AM ----

Greg Beyke <gbeyke@bellsouth.net>
06/14/01 09:12 AM

To: Harry Ehlers <harry_ehlers@urscorp.com>
cc:
Subject: Costs for ERH

Harry,

Please forward this to Jack. He called me on the road Tuesday. This is the first chance I have had to get back to my office and to the Stockton figures. Please pay particular attention to the items in red font - they are either unnecessary (due to being included in some other portion of the cost estimate), or you might have better cost numbers than I.

Call me with the inevitable questions.

Greg

ERH Cost and Summary 6-14.

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only.					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		8,970	$8.00	$71,760	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		237,100	$0.16	$37,936	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$16,671	
Hydrating Solution (lbs/electrode, electro	140	46	$0.40	$2,576	
Metal Electrodes (shipping, electrodes, co	$660	46	$125	$6,428	
Electrode Liquid Conduit		8,970	$1.10	$9,867	
Electrode Heads		46	$25	$1,150	
Subtotal Electrode Materials					$146,400
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	46	40	$75	$138,000	
Forklift to offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		80	$106	$8,480	
TRS Travel, Per Diem, and Car	$2,400	10	$106	$3,460	
Drill Cutting Waste Disposal (tons,$/ton)		50	$250	$12,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		14	$133	$1,862	
Subtotal Other Electrode Installation Costs					$165,200
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		60	$106	$6,360	
PCS Preliminary Design and Specifications		60	$143	$8,580	
PCS Cost (kW,$/kW)		5,100	$115	$586,500	
PCS Shipping (mi,$/mi)		2800	$3.50	$9,800	
Miscellaneous Shipping	$1,000			$1,000	
Crane to Offload PCS	$2,000			$2,000	
Mobilization Labor		24	$101	$2,424	
PCS Pad and Building (sq.ft., $/sq.ft.)		700	$13.25	$9,275	
TRS Senior Project Manager		6	$133	$798	
Subtotal Power Control System (PCS) Purchase and Mobilization					$626,700
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$3,450	16560	$2.25	$40,710	
Cable Shipping		1500	$1.75	$2,625	
Electrode Wetting System Materials	$4,480			$4,480	
Grounding System Materials ($, feet, $/ft)	$2,760	3,680	$1.10	$6,808	
Subtotal ERH System Construction Materials and Shipping					$54,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		115	$101	$11,615	
PCS Testing		80	$106	$8,480	
Electrode Wetting System Labor		46	$80	$3,680	
Telephone Installation				$500	
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$16,000			$16,000	
TRS Travel, Per Diem, and Car	$3,200	40	$106	$7,440	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		6	$143	$858	

Project Name: MPA & N-MPA DE Treatment Volume (cu yd): 270,500
Electrodes: 46 Plane Fare: $600
Treatment Time (weeks): 104 Round Trip Travel Time (hrs): 10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$93,900
Start-up Labor					
Electrical Specialist		172	$101	$17,372	
Staff Professional		172	$106	$18,232	
TRS Senior Project Manager		40	$133	$5,320	
Supervising Professional		20	$143	$2,860	
Professional Travel and Per Diem	$4,400	50	$106	$9,700	
Subtotal Start-up Labor					$54,300
ERH System Operations and Reporting (per week)					
Electrical Specialist		40	$101	$4,040	
Staff Professional		15	$106	$1,590	
Repair/Consumable Materials	$300			$300	
TRS Senior Project Manager		7	$133	$931	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$300	3.0	$101	$603	
ERH Operations (per week)				$7,890	
Total ERH Operations Cost (weeks, $/week)		100	$7,890		$786,600
Electrical Usage		########	$0.053		$2,347,700
Demobilization and Salvage					
Planning		80	$133	$10,640	
Forklift/Crane	$2,000			$2,000	
Trash Disposal	$500	3	$80	$740	
Electrical Specialist		160	$101	$16,160	
Staff Professional		40	$106	$4,240	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		3	$143	$429	
Travel, Per Diem, and Car	$900	10	$101	$1,910	
PCS Salvage Value		$586,500	-15%	-$87,975	
Cable Salvage Value		$37,260	-30%	-$11,178	
Subtotal Demobilization and Salvage					-$61,700
Final Reporting					
Electrical Specialist		40	$101	$4,040	
Staff Professional		120	$106	$12,720	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		40	$143	$5,720	
Travel, Per Diem, and Car	$2,400	20	$101	$4,420	
Subtotal Final Reporting					$29,600
Total ERH Cost					########

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Note: I have included items that might not be necessary or are already included in other sections of your cost estimate. I have done this under the prinicple that is easier to "zero out" something that is superfluous than it is to generate a number. Note: ERH operations continue for two years only. Well pumps and casing are not included - assumed to be part of Scenario 1 (base case)					
1) Electrode Installation					
Electrode Materials and Shipping					
Electrode Cable (feet,$/ft)		2,070	$8.00	$16,560	
Graphite (lbs,$/lb)		0	$0.22	$0	
Steel Shot (lbs,$/lb)		66,300	$0.16	$10,608	
Graphite and Steel Shipping (miles,$/ton-mile)		1,750	$0.10	$5,226	
Hydrating Solution (lbs/electrode, electro	200	9	$0.40	$720	
Metal Electrodes (shipping, electrodes, co	$380	18	$181	$3,632	
Electrode Liquid Conduit		1,350	$1.10	$1,485	
Electrode Heads		9	$25	$225	
Subtotal Electrode Materials					$38,500
Other Electrode Installation Costs					
Electrode Boring (number,add. depth,$/ft)	9	25	$75	$16,875	
Barge for Drilling	included in Scenario 1				
Drilling Overcasing	included in Scenario 1				
Cable and Hose Floats	included in Scenario 1				
Forklift to Offload Electrode Materials at	$500			$500	
TRS On-site Installation Training/Supervision		40	$106	$4,240	
TRS Travel, Per Diem, and Car	$1,600	10	$106	$2,660	
Drill Cutting Waste Disposal (tons,$/ton)		6	$250	$1,500	
Cutting Disposal Labor		4	$106	$424	
TRS Senior Project Manager		8	$133	$1,064	
Subtotal Other Electrode Installation Costs					$27,300
Power Control System (PCS) Purchase and Mobilization					
PCS Preliminary Design and Specifications		20	$106	$2,120	
PCS Preliminary Design and Specifications		20	$143	$2,860	
PCS Cost (kW,$/kW)		2,300	$115	$264,500	
PCS Shipping (mi,$/mi)		2800	$1.75	$4,900	
Miscellaneous Shipping	$500			$500	
Crane to Offload PCS	$500			$500	
Mobilization Labor		4	$101	$404	
PCS Pad and Building (add. sq.ft., $/sq.ft.)		200	$13.25	$2,650	
TRS Senior Project Manager		3	$133	$399	
Subtotal Power Control System (PCS) Purchase and Mobilization					$278,800
Abovegrade ERH System Construction Materials and Shipping					
Cables and Connectors ($, ft, $/ft)	$675	3996	$2.25	$9,666	
Cable Shipping		1500	$0.25	$375	
Electrode Wetting System Materials	$1,520			$1,520	
Grounding System Materials ($, feet, $/ft)	$0	0	$1.10	$0	
Subtotal ERH System Construction Materials and Shipping					$11,600
Labor and Other Abovegrade ERH System Construction Costs					
Electrode Connection Labor		23	$101	$2,323	
PCS Testing		20	$106	$2,120	
Electrode Wetting System Labor		9	$80	$720	
Telephone Installation				$500	

Project Name: N-MPA B/BC		Treatment Volume (cu yd):	122,300
Electrodes:	9	Plane Fare:	$600
Treatment Time (weeks):	104	Round Trip Travel Time (hrs):	10

Task Description	fixed cost	hours or units	unit rate	line total	subtotals
Utility Power Drop (assumed cost)				$40,000	
Electrical Subcontractor for Utility Conne	$4,000			$4,000	
TRS Travel, Per Diem, and Car	$1,600	20	$106	$3,720	
TRS Senior Project Manager		12	$133	$1,596	
Supervising Professional		2	$143	$286	
Subtotal Labor and Other Abovegrade ERH System Construction Costs					$55,300
Start-up Labor					
Electrical Specialist		86	$101	$8,686	
Staff Professional		86	$106	$9,116	
TRS Senior Project Manager		20	$133	$2,660	
Supervising Professional		10	$143	$1,430	
Professional Travel and Per Diem	$1,800	20	$106	$3,920	
Subtotal Start-up Labor					$26,100
ERH System Operations and Reporting (per week)					
Electrical Specialist		0	$101	$0	
Staff Professional		8	$106	$848	
Repair/Consumable Materials	$150			$150	
TRS Senior Project Manager		4	$133	$532	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$200	2.0	$101	$402	
ERH Operations (per week)				$2,220	
Total ERH Operations Cost (weeks, $/week)		100	$2,220		$221,300
Electrical Usage		#########	$0.053		$1,037,700
Demobilization and Salvage					
Planning		20	$133	$2,660	
Forklift/Crane	$0			$0	
Trash Disposal	$100	1	$80	$180	
Electrical Specialist		40	$101	$4,040	
Staff Professional		20	$106	$2,120	
TRS Senior Project Manager		5	$133	$665	
Supervising Professional		2	$143	$286	
Travel, Per Diem, and Car	$800	10	$101	$1,810	
PCS Salvage Value		$264,500	-15%	-$39,675	
Cable Salvage Value		$8,991	-30%	-$2,697	
Subtotal Demobilization and Salvage					-$30,600
Final Reporting					
Electrical Specialist		20	$101	$2,020	
Staff Professional		60	$106	$6,360	
TRS Senior Project Manager		10	$133	$1,330	
Supervising Professional		20	$143	$2,860	
Travel, Per Diem, and Car	$1,200	10	$101	$2,210	
Subtotal Final Reporting					$14,800
Total ERH Cost					########

Table 1 - Remediation Parameters and Cost

Site Name:	MPA & N-MPA DE	N-MPA B/BC
Electrical Resistance Heating (ERH) Area:	123,811 sq. ft.	41,263 sq. ft.
Shallow Extent of ERH:	173 ft bgs	40 ft MLLW
Deep Extent of ERH:	232 ft bgs	120 ft MLLW
Typical Depth to Groundwater:	10 ft bgs	0 ft MLLW
Treatment Volume:	270,500 cu yds	122,300 cu yds
Estimated Number of Electrodes:	46	9
Electrode Boring Size:	10-inch o.d.	10-inch o.d.
Electrode Depth Interval Drill Cuttings:	50 tons	6 tons
Estimated Distance Between Electrodes:	60 ft	74 ft
Total Depth of Electrodes:	220 ft bgs	105 ft MLLW
Depth to Top of Electrodes:	185 ft bgs	55 ft MLLW
Electrode Steel Shot Required:	119 tons	33 tons
Liquid Groundwater Pumping Rate:	0 gpm	12.5 gpm
Controlling Contaminant:	NAPL	NAPL
Maximum Expected Temperature:	177°C	150°C
Rating of Power Control System (PCS):	5,100 kW	2,300 kW
Average Electrical Heating Power Input:		1,130 kW
Electrical Heating Steam Production Rate:	2,900 scfm	830 scfm
Time to Heat-up Treatment Volume:	365 days	365 days
Time to Boil Treatment Volume:	365 days	365 days
Total Heating Treatment Time:	730 days	730 days
Design Remediation Energy:	44,718,000 kW-hr	19,765,000 kW-hr
Electrode Materials and Shipping	$146,400	$38,500
Other Electrode Installation Costs	$165,200	$27,300
PCS Purchase and Mobilization	$626,700	$278,800
ERH System Materials and Shipping	$54,600	$11,600
Labor and Other ERH System Construction Costs	$93,900	$55,300
Start-up Labor	$54,300	$26,100
ERH Operations Cost	$786,600	$221,300
Electrical Usage (at $0.053 per kW-hr)	$2,347,700	$1,037,700
Demobilization and Salvage	-$61,700	-$30,600
Final Reporting	$29,600	$14,800
	$4,243,300	**$1,680,800**

"Steam Tech" <heron@steamtech.com>

07/07/01 06:59 PM

To: John_Spear@URSCorp.com, carroll@steamtech.com
cc: "Susan Schima" <schima@steamtech.com>, sowers@steamtech.com, Harry_Ehlers@URSCorp.com
Subject: Re: VEA & DPT questions

>
>
> "Susan
> Schima" To: John_Spear@URSCorp.com
> <schima@steam cc: heron@steamtech.com,
sowers@steamtech.com
> tech.com> Subject: Re: Questions &
comments on text
>
> 07/06/2001
> 04:14 PM
>
>
>
>
>
>
>
> Dear Jack,
>
> Below are some costing estimates involved with an ERT survey. These are
> ballpark figures, based on current market values for materials and
> equipment rentals. Please do not hesitate to email me for any further
> questions or for more details on the costing breakdown.
>
> You might expect the general costs for fabricating and operating an ERT and
> temperature survey to include the following:
>
> VEA Fabrication with Thermocouples: $150 per 10 ft, assuming one
> electrode
> and two thermocouples per 10 ft, includes labor and materials
>
> Data Collection Hardware: $300 per day
>
> Mob/Demob: $3000
>
> Labor:
> Data Collection: $300 per day
> Processing Data: $160 per day
> Imaging Data: $145 per day
>
> Note the VEA cost estimate is PER 10 FT. This includes the material costs,
> such as Teflon wire, fiberglass rod, stainless steel electrode, etc, and
> labor for one supervisor and one technician. So, for a single VEA at 120 ft
> depth, the cost might be around $1800.
>
> Also, the VEA cost was based on CPT push. You may need to add more for
> drilling.
>
> Please see Table 6.1.1 for proposed schedule of data collection days to
> estimate grand total for that.
>
>
>
> Distributed Temperature Sensing (DTS) might break down as follows:
>
> Fiber Optic Cable: expect $2.50 per ft for the high temperature, durable,
> coated cable
>
> Data Collection Equipment: $70,000.00 to buy, $6,000 per month lease
>

>
>
>
> Sincerely,
> Susan
>
>
>
>
>

MB-replies-Jack-July7.do

Hello Jack,

I will try to answer your questions, since I will be on the road until Thursday morning.

Jacvk: I must be really stupid but I still don't understand this whole system and Table 6.1.1 also confuses me somewhat. Do we have the fiber optic DPT system? It isn't mentioned in Section 6.1 of the text but is in Appendix D. I had thought that the idea was played with but wasn't part of this CD.

Gorm: Don't worry, we know you are a bright fella. Yes we plan to include DTS in the design. Susan, please review the text and make sure that we present this design.

Jack: Regarding the VEA in operation. Will the operators at the site (we currently have two full time 24 hours/day plus a technical person 8 hours per day during thermal and cool down phases in the estimate) be able to provide the labor that Susan mentions to operate and monitor the VEA system or do we need the additional at the rates quoted below for data collection, processing data and imaging data?

Gorm: Please assume that the operators can run the DTS as well.

Jack: What additional system/hardware/software besides our computer system priced for the site operators office do we need to collect and report the data from the VEA array? Susan mentions a pretty expensive data collection system for the DPT which if we need I will add to the estimate but I'm not sure what else. Gorm gave me a table with the linear ft of VEA needed and I have priced installation including grouting of this in the estimate but I have not received anything about the DPT system and how it is installed. If we don't use the fiber optic wire is there some other temperature sensing system that will be installed?

Will a data collection and some kind of power wire be needed for every electrode going back to the operations office? What is the number of electrodes? (Perhaps the number is on a table somewhere and I have forgotten where.) .

Gorm: We need a DTS system (70k). The fiberoptic cable and ERT electrodes with wires should be included in the cost per 10 ft provided by Susan.

Jack: As for Table 6.1.1 what are the "new P&T" extraction wells and monitoring wells? Is this a left over from the time we were planning to P&T for 20 or more years after the cool down or are these the extraction and monitoring wells we still have in the system?

Gorm: They are the NAPL recovery and hydraulic control wells located outside the thermal treatment area, as designed by Mike Bailey.

2006.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.25. START UP, TESTING, O&M PLAN								
2006.25. 5. O&M MANUAL								
2006.25. 5.10. PCS Commissioning Manual								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00 EA	4,268	0	0	0	500	4,768	4768.00
2006.25. 5.13. Preliminary Draft - O&M Manual Spec Section 01830								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Site Superintendant		61.99	0.00	0.00	0.00	0.00	61.99	
	8.00 HR	496	0	0	0	0	496	61.99
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I; Project Manager	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol Officer	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III Health and Safety Manager (CIH)	4.00 HR	414	0	0	0	0	414	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preliminary Draft - O&M Manua	1.00	EA	23,239	0	0	0	600	23,839	23839.48
2006.25. 5.18. Revised Draft - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	20.00	HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	4.00	HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	8.00	HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	8.00	HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00	EA	7,955	0	0	0	600	8,555	8555.20
2006.25. 5.23. Final - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	8.00	HR	730	0	0	0	0	730	91.30

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Chem Quality Control Officer	2.00	HR	84.70 169	0.00 0	0.00 0	0.00 0	0.00 0	84.70 169	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	4.00	HR	84.70 339	0.00 0	0.00 0	0.00 0	0.00 0	84.70 339	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	1.00	HR	103.40 103	0.00 0	0.00 0	0.00 0	0.00 0	103.40 103	103.40
USR AA Technician VI - Plant Operator	20.00	HR	35.42 708	0.00 0	0.00 0	0.00 0	0.00 0	35.42 708	35.42
USR AA Engineer/Scientist IV	4.00	HR	59.40 238	0.00 0	0.00 0	0.00 0	0.00 0	59.40 238	59.40
TOTAL Final - O&M Manual	1.00	EA	5,280	0	0	0	600	5,880	5880.00
TOTAL O&M MANUAL	1.00	JOB	40,743	0	0	0	2,300	43,043	43042.68
2006.25.10. STARTUP/COMMISSION TREATMENT SYS									
2006.25.10. 5. ENGINEERS & TECHNICIANS									
USR AA Principal Engineer/Scientist III; Program Mgr.	80.00	HR	103.40 8,272	0.00 0	0.00 0	0.00 0	0.00 0	103.40 8,272	103.40
USR AA Senior Engineer/Scientist II - Startup/Proveout Project Manager	320.00	HR	72.60 23,232	0.00 0	0.00 0	0.00 0	0.00 0	72.60 23,232	72.60
USR AA Principal Engineer/Scientist I; P&ID Checkout	240.00	HR	91.30 21,912	0.00 0	0.00 0	0.00 0	0.00 0	91.30 21,912	91.30
USR AA Principal Engineer/Scientist I; I&E Checkout	80.00	HR	91.30 7,304	0.00 0	0.00 0	0.00 0	0.00 0	91.30 7,304	91.30
USR AA Principal Engineer/Scientist I; PC/MMI Checkout	120.00	HR	91.30 10,956	0.00 0	0.00 0	0.00 0	0.00 0	91.30 10,956	91.30
USR AA Principal Engineer/Scientist I; PC/MMI Programmer	200.00	HR	91.30 18,260	0.00 0	0.00 0	0.00 0	0.00 0	91.30 18,260	91.30

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00	HR	18,260	0	0	0	0	18,260	91.30
Startup Engineer									
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
-	16.00	HR	1,355	0	0	0	0	1,355	84.70
Director QA/QC									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Technician/Analyst IV -			33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	40.00	HR	1,320	0	0	0	0	1,320	33.00
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00	HR	6,776	0	0	0	0	6,776	84.70
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	1120.00	HR	59,506	0	0	0	0	59,506	53.13
USR AA GWTP Plant Operator			43.47	0.00	0.00	0.00	0.00	43.47	
	600.00	HR	26,082	0	0	0	0	26,082	43.47
MIL AA Electricians			35.93	0.00	0.00	0.00	0.00	35.93	
	80.00	HR	2,874	0	0	0	0	2,874	35.93
USR AA Vendor/Manufacturers Reps;			0.00	0.00	0.00	4000.00	0.00	4000.00	
Installation and Startup	8.00	EA	0	0	0	32,000	0	32,000	4000.00
USR AA Site QC/HSO			43.47	0.00	0.00	0.00	0.00	43.47	
	270.00	HR	11,737	0	0	0	0	11,737	43.47
USR AA Electrical Specialist			0.00	0.00	0.00	101.00	0.00	101.00	
	172.00	HR	0	0	0	17,372	0	17,372	101.00
USR AA Staff Professional			0.00	0.00	0.00	106.00	0.00	106.00	
	172.00	HR	0	0	0	18,232	0	18,232	106.00
USR AA TRS Sr. Project Manager			0.00	0.00	0.00	0.00	0.00	0.00	
	40.00	HR	0	0	0	0	0	0	0.00
USR AA TRS Supervising Professional			0.00	0.00	0.00	143.00	0.00	143.00	
	20.00	HR	0	0	0	2,860	0	2,860	143.00
USR AA TRS Trave, Per Diem			0.00	0.00	0.00	9700.00	0.00	9700.00	
	1.00	LS	0	0	0	9,700	0	9,700	9700.00
TOTAL ENGINEERS & TECHNICIANS	1.00	JOB	220,750	0	0	80,164	0	300,914	300913.96

2006.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.25.10.10. TRAVEL & PER DIEM								
USR AA Mileage on Personal Car, Trip s for O&M Proj Mgr from office.	16000 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 4,960	0.31 4,960	0.31
USR AA Apartments for site personnel Mgr and HSO.	8.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	1600.00 12,800	1600.00 12,800	1600.00
USR AA M&IE	120.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	42.00 5,040	42.00 5,040	42.00
USR AA Airfare Trips for Vendor Reps and Instrumentation and Electrical Engineering personnel.	10.00 EA	0.00 0	0.00 0	0.00 0	0.00 0	500.00 5,000	500.00 5,000	500.00
USR AA Rental Car, Total of 4 cars f or two months.	80.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	45.00 3,600	45.00 3,600	45.00
USR AA Parking/Taxi	20.00 EA	0.00 0	0.00 0	0.00 0	0.00 0	20.00 400	20.00 400	20.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	31,800	31,800	31800.00
2006.25.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot hes	1.00 LS	0.00 0	0.00 0	5000.00 5,000	0.00 0	0.00 0	5000.00 5,000	5000.00
USR AA Fork Lift Rental	4.00 MO	0.00 0	1300.00 5,200	0.00 0	0.00 0	200.00 800	1500.00 6,000	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P KUP	640.00 HR	0.00 0	7.52 4,814	0.00 0	0.00 0	0.00 0	7.52 4,814	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	10,014	5,000	0	800	15,814	15814.02
2006.25.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine	2.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	35.00 70	35.00 70	35.00
USR AA Office Drinking Water Service	3.00 MO	0.00 0	0.00 0	0.00 0	0.00 0	75.00 225	75.00 225	75.00

2006.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	2.00 MO	0	800	0	0	0	800	400.00
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	3000.00	0.00	0.00	3000.00	
	2.00 LS	0	0	6,000	0	0	6,000	3000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 MO	0	0	0	400	0	400	200.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	400.00	0.10	400.10	
	2.00 MO	0	0	0	800	0	800	400.10
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	1,600	6,800	1,200	13,395	22,995	22995.20

2006.25.10.26. OPERATING/PROCESS UTILITIES
Assume 1.5 Megawatt-Hrs per day or 62.5 KW per hour @ $0.053/KW.

USR AA Natural Gas, 100 mmbtu/hour @		0.00	0.00	0.00	0.00	336.00	336.00	
1050 btu/scft @ $3.50/MCFT	100.00 HR	0	0	0	0	33,600	33,600	336.00
USR AA Electircity for Electrodes:		0.00	0.00	0.00	0.00	83.30	83.30	
Assume 20 megawatt/day or 833	100.00 HR	0	0	0	0	8,330	8,330	83.30

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Electricity for Pumps, Treatm			0.00	0.00	0.00	0.00	6.25	6.25	
ent	100.00	HR	0	0	0	0	625	625	6.25
Plant, Steam:									
USR AA Water @ 250 gpm or 15,000			0.00	0.00	0.00	0.00	16.00	16.00	
gal/hour = 20 units/hour @ $0	100.00	HR	0	0	0	0	1,600	1,600	16.00
.80									
USR AA Water Meter Service Charge:			0.00	0.00	0.00	0.00	0.28	0.28	
198.00/mon	100.00	HR	0	0	0	0	28	28	0.28
TOTAL OPERATING/PROCESS UTILITIES	1.00	JOB	0	0	0	0	44,183	44,183	44183.00
2006.25.10.30. CHEMICALS									
USR AA GAC (Liquid); average useage			0.00	0.00	1.87	0.00	0.00	1.87	
35	1050.00	LB	0	0	1,964	0	0	1,964	1.87
lb/day x 30 days operation									
USR AA GAC (Air); 40 lb/ day x 30 da			0.00	0.00	2.30	0.00	0.00	2.30	
ys	1200.00	LB	0	0	2,760	0	0	2,760	2.30
operation = 1200 lb.									
USR AA Alum			0.00	0.00	2.00	0.00	0.00	2.00	
	1050.00	LB	0	0	2,100	0	0	2,100	2.00
USR AA Caustic			0.00	0.00	0.15	0.00	0.00	0.15	
	10000	LB	0	0	1,500	0	0	1,500	0.15
USR AA Shipping Caustic			0.00	0.00	0.00	500.00	0.00	500.00	
	3.00	EA	0	0	0	1,500	0	1,500	500.00
USR AA Polymer, One 55 gal drum/mo.			0.00	0.00	1.78	0.00	0.00	1.78	
	135.00	LB	0	0	240	0	0	240	1.78
USR AA Shipping Acid			0.00	0.00	0.00	500.00	0.00	500.00	
	1.00	EA	0	0	0	500	0	500	500.00
USR AA Acid			0.00	0.00	0.04	0.00	0.00	0.04	
	1500.00	LB	0	0	60	0	0	60	0.04
TOTAL CHEMICALS	1.00	JOB	0	0	8,624	2,000	0	10,624	10623.80

2006.25. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.25.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filter A		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter B		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter C Cartridges		0.00	0.00	21.20	0.00	0.00	21.20	
	230.00 EA	0	0	4,876	0	0	4,876	21.20
USR AA Filter D		0.00	0.00	6.70	0.00	0.00	6.70	
	24.00 EA	0	0	161	0	0	161	6.70
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	6,109	0	0	6,109	6108.80
2006.25.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	3.00 MO	0	1,350	0	0	0	1,350	450.00
USR AA LEL		0.00	200.00	0.00	0.00	0.00	200.00	
	3.00 MO	0	600	0	0	0	600	200.00
USR AA PPE - Level D Modified		0.00	0.00	2400.00	0.00	0.00	2400.00	
	1.50 MO	0	0	3,600	0	0	3,600	2400.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	1,950	3,600	0	0	5,550	5550.00
2006.25.10.45. DISPOSALS STARTUP								
USR AA Sludge Disposal		0.00	0.00	0.00	420.00	0.00	420.00	
	40.00 DRM	0	0	0	16,800	0	16,800	420.00
USR AA Sludge Waste Characterization - Full TCLP & Waste Char. for Carbon (liquid and vapor) and sludge.		0.00	0.00	0.00	0.00	665.00	665.00	
	2.00 EA	0	0	0	0	1,330	1,330	665.00
USR AA Oily Waste		0.00	0.00	0.00	0.55	0.00	0.55	
	200.00 GAL	0	0	0	110	0	110	0.55
TOTAL DISPOSALS STARTUP	1.00 JOB	0	0	0	16,910	1,330	18,240	18240.00

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.25.10.50. PERSONNEL TRAINING									
USR AA Senior Engineer/Scientist I -			67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00	HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA GWTP Plant Manager			53.13	0.00	0.00	0.00	0.00	53.13	
	40.00	HR	2,125	0	0	0	0	2,125	53.13
USR AA Senior Engineer/Scientist I -			67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00	HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -			33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00	HR	528	0	0	0	0	528	33.00
USR AA Misc Materials			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00	JOB	8,510	0	500	0	0	9,010	9009.60
2006.25.10.55. SAMPLING/ANALYSIS; STARTUP									
2006.25.10.55.05. DATA VALIDATION									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	27.00	HR	1,604	0	0	0	0	1,604	59.40
TOTAL DATA VALIDATION	1.00	JOB	1,604	0	0	0	0	1,604	1603.80

2006.25.10.55.30. ANALYTICALS PROCESS
Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	13.00	EA	0	0	1,287	0	0	1,287	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	26.00	EA	0	0	131	0	0	131	5.02

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M HTW AA TAL Metals			0.00	0.00	80.00	0.00	0.00	80.00	
	18.00	EA	0	0	1,440	0	0	1,440	80.00
HTW AA TCL VOC (SW-846, 8260B)			0.00	0.00	296.00	0.00	0.00	296.00	
Includes 4 trip blanks.	22.00	EA	0	0	6,512	0	0	6,512	296.00
M HTW AA TPH EPA 418.1			0.00	0.00	120.00	0.00	0.00	120.00	
	18.00	EA	0	0	2,160	0	0	2,160	120.00
HTW AA TCL SVOC (SW-846, 8270C)			0.00	0.00	564.00	0.00	0.00	564.00	
	18.00	EA	0	0	10,152	0	0	10,152	564.00
HTW AA Suspended Solids			0.00	0.00	17.00	0.00	0.00	17.00	
	18.00	EA	0	0	306	0	0	306	17.00
HTW AA Dissolved Solids			0.00	0.00	17.00	0.00	0.00	17.00	
	18.00	EA	0	0	306	0	0	306	17.00
M AIR AA Dioxins & Dibenzofurans (8280)	5.00	EA	0.00	0.00	950.00	0.00	0.00	950.00	
			0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)	18.00	EA	0.00	0.00	280.00	0.00	0.00	280.00	
			0	0	5,040	0	0	5,040	280.00
TOTAL ANALYTICALS PROCESS	1.00	JOB	0	0	32,124	0	0	32,124	32123.52
2006.25.10.55.40. BOILER AIR EMISSIONS									
USR AA SVOC's			0.00	0.00	0.00	275.00	0.00	275.00	
	5.00	EA	0	0	0	1,375	0	1,375	275.00
USR AA Dioxins/Furans			0.00	0.00	0.00	950.00	0.00	950.00	
	5.00	EA	0	0	0	4,750	0	4,750	950.00
USR AA VOC's			0.00	0.00	0.00	60.00	0.00	60.00	
	5.00	EA	0	0	0	300	0	300	60.00
USR AA Metals (Ag, As, Ba, Be)			0.00	0.00	0.00	40.00	0.00	40.00	
	5.00	EA	0	0	0	200	0	200	40.00
USR AA PM			0.00	0.00	0.00	35.00	0.00	35.00	
	5.00	EA	0	0	0	175	0	175	35.00
USR AA HCL			0.00	0.00	0.00	100.00	0.00	100.00	
	5.00	EA	0	0	0	500	0	500	100.00

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Chlorine			0.00	0.00	0.00	40.00	0.00	40.00	
	5.00	EA	0	0	0	200	0	200	40.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	10.00	EA	0	0	990	0	0	990	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	10.00	EA	0	0	50	0	0	50	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	100.00	EA	0	0	1,000	0	0	1,000	10.00
TOTAL BOILER AIR EMISSIONS	1.00	JOB	0	0	2,040	7,500	0	9,540	9540.20
2006.25.10.55.45. VAPOR PH GAC EMISSIONS									
USR AA SVOC's			0.00	0.00	0.00	275.00	0.00	275.00	
	2.00	EA	0	0	0	550	0	550	275.00
USR AA Dioxins/Furans			0.00	0.00	0.00	950.00	0.00	950.00	
	2.00	EA	0	0	0	1,900	0	1,900	950.00
USR AA TPH			0.00	0.00	0.00	60.00	0.00	60.00	
	2.00	EA	0	0	0	120	0	120	60.00
USR AA Metals (Ag, As, Ba, Be)			0.00	0.00	0.00	40.00	0.00	40.00	
	2.00	EA	0	0	0	80	0	80	40.00
USR AA PM			0.00	0.00	0.00	35.00	0.00	35.00	
	2.00	EA	0	0	0	70	0	70	35.00
USR AA HCL			0.00	0.00	0.00	100.00	0.00	100.00	
	2.00	EA	0	0	0	200	0	200	100.00
USR AA Chlorine			0.00	0.00	0.00	40.00	0.00	40.00	
	2.00	EA	0	0	0	80	0	80	40.00
USR AA CO			0.00	0.00	0.00	115.00	0.00	115.00	
	2.00	EA	0	0	0	230	0	230	115.00
USR AA SOx			0.00	0.00	0.00	150.00	0.00	150.00	
	2.00	EA	0	0	0	300	0	300	150.00
USR AA NO2			0.00	0.00	0.00	150.00	0.00	150.00	
	2.00	EA	0	0	0	300	0	300	150.00

2006.25. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8			0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00	EA	0	0	396	0	0	396	99.00
chest									
shipments									
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00	EA	0	0	20	0	0	20	5.02
USR AA Tedlar Bags			0.00	0.00	10.00	0.00	0.00	10.00	
	25.00	EA	0	0	250	0	0	250	10.00
TOTAL VAPOR PH GAC EMISSIONS	1.00	JOB	0	0	666	3,830	0	4,496	4496.08
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00	JOB	1,604	0	34,830	11,330	0	47,764	47763.60
2006.25.10.60. SOURCE TEST									
USR AA Source Test			0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL SOURCE TEST	1.00	JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL STARTUP/COMMISSION TREATMENT	1.00	JOB	230,863	13,564	65,462	141,604	91,508	543,002	543001.98
TOTAL START UP, TESTING, O&M PLAN	1.00	JOB	271,606	13,564	65,462	141,604	93,808	586,045	586044.66
2006.30. DEMOBILIZATION									
2006.30.21. DEMOBILIZATION									
2006.30.21.01. Removal of Temp Facilities									
USR AA Demobe Contractor Ofc Trailer			0.00	0.00	0.00	200.00	0.00	200.00	
	2.00	LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer			0.00	0.00	0.00	200.00	0.00	200.00	
	1.00	LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer			0.00	0.00	0.00	100.00	0.00	100.00	
	1.00	LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit			187.66	19.73	25.00	0.00	0.00	232.39	
y	1.00	EA	188	20	25	0	0	232	232.39
Post Abatement Clean Up									
USR AA Removel Water Supply			0.00	0.00	0.00	500.00	0.00	500.00	
	1.00	EA	0	0	0	500	0	500	500.00

2006.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Remove Furniture in Temp Office			0.00	0.00	0.00	250.00	0.00	250.00	
	1.00	LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Removal; 01770			284.24	87.95	0.00	0.00	0.00	372.20	
	4.00	AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00	JOB	1,325	372	25	1,450	0	3,171	3171.18
2006.30.21.02. Removal of Temp Utilities									
USR AA Remove Temp Electricity			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL Removal of Temp Utilities	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
2006.30.21.04. Demobe of Construction Equipment									
USR AA Demobe Heavy Equipment			0.00	0.00	0.00	0.00	200.00	200.00	
	5.00	EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00	JOB	0	0	0	0	1,000	1,000	1000.00
TOTAL DEMOBILIZATION	1.00	JOB	1,325	372	25	11,450	1,000	14,171	14171.18
2006.30.22. REPORTS, CLOSEOUT									
2006.30.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	4,356	0	0	0	600	4,956	4956.00

2006.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2006.30.22.10. Record Drawings									
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	20.00	EA	0	0	0	0	1,000	1,000	50.00
USR AA Senior Engineer/Scientist I -			67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	400.00	HR	26,840	0	0	0	0	26,840	67.10
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Site Superintendant	160.00	HR	11,616	0	0	0	0	11,616	72.60
USR AA Construction Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	80.00	HR	7,304	0	0	0	0	7,304	91.30
TOTAL Record Drawings	1.00	JOB	45,760	0	0	0	1,000	46,760	46760.00
2006.30.22.15. Chemical Data Final Report									
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
-	16.00	HR	1,355	0	0	0	0	1,355	84.70
Chem Qual Control Officer									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00	HR	6,776	0	0	0	0	6,776	84.70
TOTAL Chemical Data Final Report	1.00	JOB	8,439	0	0	0	600	9,039	9039.20
2006.30.22.20. Remedial Action Report									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	100.00	HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II			41.80	0.00	0.00	0.00	0.00	41.80	
	400.00	HR	16,720	0	0	0	0	16,720	41.80
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
	400.00	HR	33,880	0	0	0	0	33,880	84.70
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	400.00	HR	19,360	0	0	0	0	19,360	48.40

2006.30. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA ODC's			0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00	LS	0	0	0	0	1,000	1,000	1000.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	80.00	HR	3,080	0	0	0	0	3,080	38.50
TOTAL Remedial Action Report	1.00	JOB	83,380	0	0	0	1,000	84,380	84380.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	141,935	0	0	0	3,200	145,135	145135.20
TOTAL DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL CONSTRUCTION/STARTUP STEP 1	1.00	JOB	1,472,749	44,198	1,165,152	1,569,954	188,795	4,440,848	4440848.18

2007. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2007. HEAT YR1 STEP 1								
2007. 5. GENERAL CONDITIONS								
2007. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2007. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2007. 5.10. ERM SYSTEM OP/REPORTING								
USR AA Electrical Specialist		0.00	0.00	0.00	101.00	0.00	101.00	
	2080.00 HR	0	0	0	210,080	0	210,080	101.00
USR AA Staff Professional		0.00	0.00	0.00	106.00	0.00	106.00	
	780.00 HR	0	0	0	82,680	0	82,680	106.00
USR AA TRS Sr. Project Manager		0.00	0.00	0.00	0.00	0.00	0.00	
	364.00 HR	0	0	0	0	0	0	0.00
USR AA TRS Supervisiing Professional		0.00	0.00	0.00	143.00	0.00	143.00	
	156.00 HR	0	0	0	22,308	0	22,308	143.00
USR AA TRS Trave, Per Diem		0.00	0.00	0.00	603.00	0.00	603.00	
	52.00 WK	0	0	0	31,356	0	31,356	603.00
TOTAL ERM SYSTEM OP/REPORTING	12.00 MO	0	0	0	346,424	0	346,424	28868.67
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	382,424	1,878	450,509	37542.40
2007.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00

2007.10. SITE FACILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67
2007.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2007.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00

2007.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2007.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Spare Parts/Maintenance		0.00	0.00	500.00	0.00	0.00	500.00	
	12.00 MO	0	0	6,000	0	0	6,000	500.00
USR AA Well Maintenance		0.00	0.00	0.00	1500.00	0.00	1500.00	
	1.00 LS	0	0	0	1,500	0	1,500	1500.00
TOTAL MAINTENANCE	12.00 MO	0	0	16,000	14,500	0	30,500	2541.67

2007.30. UTILITIES

Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.

Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.

Makeup water requirements.
Costed at 0.80/750 gallon unit per local utilit

USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU @ $3.50		0.00	0.00	0.00	0.00	3.50	3.50	
	283290 MBT	0	0	0	0	991,515	991,515	3.50
USR AA Electricity for Electrodes (Assumes 0.06/KWH)		0.00	0.00	0.00	0.00	60.00	60.00	
	8760.00 KKW	0	0	0	0	525,600	525,600	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	8760.00 KKW	0	0	0	0	-525,600	-525,600	-60.00
USR AA Electricity for Pumps, Treatment Plant, Steam: $60 per K KWH		0.00	0.00	0.00	0.00	60.00	60.00	
	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit		0.00	0.00	0.00	0.00	0.80	0.80	
	42048 UNT	0	0	0	0	33,638	33,638	0.80

2007.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,295,129	1,295,129	107927.45
2007.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2007.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	9643.00 LB	0	0	9,643	0	0	9,643	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	2900.00 LB	0	0	4,350	0	0	4,350	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10730 LB	0	0	1,610	0	0	1,610	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	26680 LB	0	0	1,067	0	0	1,067	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	17400 LB	0	0	1,740	0	0	1,740	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	870.00 LB	0	0	1,549	0	0	1,549	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00

Table 7-8
Utility Demand for Phasing Alternative of Scenario 1

	Scenario 1	Step 1	Step 2	Step 3	Step 4	Unit	Comment
Fresh water demand	200	50	60	100	85	gpm	
ERH power	2,550	1,000	0	0	0	kW	DE ERH in Step 1
Process power	1,000	500	500	700	700	kW	Increases with vacuum extraction rate
Power demand	3,550	1,500	500	700	700	kW	
Gas firing rate	152,381	33,956	39,971	72,757	60,538	scfh	80% firing rate in average

THE SEATTLE TIMES LOCAL / REGIONAL THURSDAY, JUNE 14, 2001

Expect a cap on electrical rates outside California

P-I STAFF AND NEWS SERVICES

WASHINGTON — Federal regulators are expected next week to expand price restrictions on electricity to include Washington state, according to government officials.

According to congressional and industry sources, the Federal Energy Regulatory Commission on Monday is likely to broaden the caps, which it announced in April. They now apply only to California, and only when low power reserves cause a supply emergency.

The restrictions impose ceilings on how much power generators can charge utilities on the wholesale market.

It is unclear what the effect would be on energy prices in Washington state, but electrical and natural-gas prices in California declined after the April order. Although FERC Chairman Curtis Hebert attributed the drop to the limited price controls, Senate Democrats say the reason for the lower prices is uncertain.

Western lawmakers said expanding the price caps to other states and to non-emergency transactions would be a step in the right direction but would still fall short of the extended price caps for which Sen. Patty Murray, D-Wash., and others have been calling.

"It's encouraging that they are going to wake up and smell the coffee and recognize they have a legal responsibility to assure prices are just and reasonable," said Murray's spokesman, Todd Webster. "Senator Murray is hopeful that FERC will come out of hibernation and address the price gouging."

Murray has been pressing FERC to set a two-year price cap that would not apply to any plants currently under construction "but would tamp down on some of these crazy prices being charged," Webster said.

This week, electrical prices on the spot market in California fell to below $100 a megawatt-hour for the first time this year. Natural-gas prices eased, too. Earlier this year, prices frequently surpassed $300 a megawatt-hour, 10 times what they were in precrisis 1999. A megawatt is enough electricity to serve about 600 homes.

"Our price mitigation plan is working," Hebert said yesterday. However, California officials say it is too early to make that claim.

At a Senate hearing yesterday, Sen. Dianne Feinstein, D-Calif., said the reason for recent price drops is unclear, but that "it now appears" FERC will broaden its April order.

The five-member commission of three Republicans and two Democrats has come under attack from Democrats in Congress and from California Gov. Gray Davis. Davis has criticized the limited price caps, calling them inadequate and full of loopholes; he has also charged FERC with being far too timid in curtailing price gouging in the wholesale Western power markets.

The commission regulates wholesale electrical markets and interstate natural-gas pipelines. Under a 1934 law, it is required to ensure prices are just and reasonable.

Hebert, a Republican named chairman by President Bush in January, defended the agency at an energy forum yesterday but also acknowledged the recent criticism: "We're not the most popular people in town right now."

Also yesterday, several economists told a Senate hearing that temporary price controls, if structured properly, should not impede electrical investments and supplies as Republican lawmakers and the administration have argued.

"It is incorrect that regulation necessarily interferes with supplies," Cornell economist Alfred Kahn, a prominent deregulation advocate, told the Senate Governmental Affairs Committee.

Kahn said that if price caps were temporary, exempted new power plants, and provided sufficient profits, "there will be no shortage of people interested and willing to build new power plants."

"The greatest danger is continued chaos," said Paul Joskow, an economist at the Massachusetts Institute of Technology. He, too, urged some price controls based on costs of production.

Sen. Fred Thompson, R-Tenn., said the economists were painting "a rosy picture." He read letters from several Wall Street analysts who insisted that price controls would be a "recipe for disaster" and make investors reluctant to enter the California power market.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

URS

SEATTLE POST-INTELLIGENCER I THURSDAY, JUNE 14, 2001

NATION

POWER

CONTINUED FROM B 1

in April apply only to California markets in emergency situations.

Peak demand prices for electricity on the Mid-Columbia wholesale market — where Northwest utilities buy power — slid below $100 a megawatt-hour June 6 for the first time this year. At times this month they have dipped as low as $36.80.

That's a far cry from the $500 per megawatt-hour some expected for this time of year or the up to $750 per megawatt-hour paid in December.

Prices for natural gas are also tumbling, hitting $3.46 per million British thermal units for gas traded at the hub at Sumas, Whatcom County, yesterday, down from an unprecedented high of $14.20 in January.

The drop in price this spring has been precipitous, with prices falling 23.4 percent from last month to this month, according to Kelley Doolan, natural-gas market specialist for Platts, a division of McGraw-Hill.

Experts cited a range of factors for the wholesale-price drops:

• Weather is the biggest single reason, as well as the largest wild card in the West Coast energy picture. Unusually cool, wet weather has prevailed in recent weeks throughout the West, cutting the usual demand for air conditioning.

• Decline in demand as a result of conservation. Power consumption is down 6.5 percent in California for the three months ending in May compared with the similar period a year ago, adjusted for differences in the weather, according to the California Energy Commission.

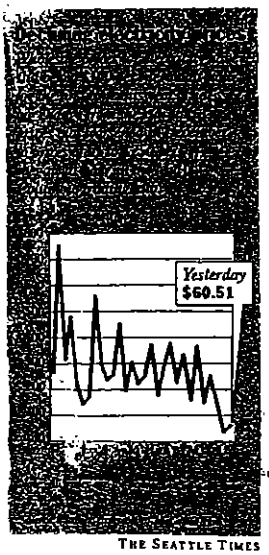
In Washington state, energy experts report a 5 percent reduction in use so far this year. "What we are doing is working," said Ralph Cavanaugh, Northwest energy-program director for the Natural Resources Defense Council an environmental group.

• Decrease in demand by industrial users. Power guzzlers, such as aluminum companies, have unplugged, reducing demand on the grid in the Pacific Northwest.

• Increase in supply. California power plants shut down for spring maintenance in April and May are now back on line for the summer. That put about 15,000 megawatts of generating capacity back on the grid. New power plants have also fired up, including one in Oregon and another in Idaho.

Spring runoff has also added water to Northwest rivers, boosting supply for hydroelectric generation.

Relatively speaking, though,



THE SEATTLE TIMES

wholesale prices for electricity and natural gas are high: gas costs about twice what it did a year and a half ago, and so does electricity. "We are out of the stratosphere, but we haven't landed," said Jim Lazar, an independent energy consultant based in Olympia.

And consumers have yet to see any cut in retail rates.

Gas prices statewide went up by 50 percent this year over last for the average residential customer in response to the jump in wholesale prices.

Electric utilities around the region also raised rates and are forecasting rate increases, not decreases.

While wholesale electricity prices could indeed spike when the water runs low and the temperatures rise, some experts see longer-term relief in natural-gas prices.

Cool weather — which has reduced the demand for power, including gas-fired power generation — has allowed suppliers to put natural gas into storage at record rates.

That means storage could be adequate for the coming winter, Doolan said. New supplies should also be available in time for the coming heating season because of increased drilling.

Electrical supplies from hydropower will also increase if normal rains return to the Northwest this fall. That in turn would decrease reliance on more expensive gas-generated power, dampening the demand and price for natural gas.

Lynda V. Mapes can be reached at 206-464-2736 or lmapes@seattletimes.com.

URS Corporation
1400 Century Square
1501 4th Avenue
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

John Spear
10/26/01 11:17 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Backup for energy pricing

Harry,

The attached excel file is a summary of our sources for the energy prices from EIA's report. I tried to pull the sections out of the report we want to put in the estimate as backups but they are pdf, gif or some other kinds of files that I can't get into. You will have to go the website or have someone else go there, and find the tables and sections I reference on the spreadsheet. Otherwise I could copy them here and fed ex them to you. I will fax them to you now so you know what they look like.

The website address is: www.eia.doe.gov/oiaf/aeo

I think that will get you there. The tables are mostly in the appendices which have a link in very small print to the left of the text. Table 26 is the only table listed that is in the text itself on page 107.

Jack

Sources for Elec & Gas Prices.:

McCORMICK & BAXTER

10/25/01

SOURCES FOR ASSUMPTIONS FOR NATURAL GAS AND ELECTRICITY PRICING USED IN THE CD ESTIMATES

Annual Energy Outlook 2001 With Projections to 2020
Report #DOE/EIA-0383(2001)
Published by:

Energy Information Administration (EIA)
Office of Integrated Analysis and Forecasting
U.S. Department of Energy

Publication available on the WEB at:
www.eia.doe.gov/oiaf/aeo/

Attached sections and tables of the report:

1. Overview
2. Table 26. Comparison of natural gas forecasts..
3. Table A3. Energy Prices by Sector and Source
4. Table A8. Electricity Supply, Disposition, Prices and Emissions
5. Table A14. Natural Gas Prices, Margins & Revenues (Ref. Case Forecast)
6. Table B14. Natural Gas Prices, Margins & Revenue (Economic Growth Case Comparisons)

From this report the assumptions have been made for the conceptual design estimate as follows:

Natural gas will be available to the site at the price of:	$3.50	per Million Btu
Electricity will be available to the site at the price of :	$0.06	per KW hour

COST IMPACTS OF INCREASED UTILITY RATES

	RATE	UNIT	SCENARIO 1	SCENARIO 2	SCENARIO 3	P&T
GAS						
	$7.00	MMBTU	$20,552,203	$30,813,298	$41,081,657	$0
	$10.00	MMBTU	$38,168,055	$57,224,717	$76,294,566	$0
ELECTRICITY						
	$0.10	KWH	$1,754,725	$2,368,444	$4,181,897	$7,939,200
	$0.30	KWH	$10,491,743	$14,210,649	$19,129,337	$47,638,500

NOTE:

1. Total cost increases are for the life cycle of the project with no present value discount. (7 years for all thermal scenarios and 100 years for the P&T option.)
2. Electricity cost increases for the thermal options assume that co-generation covers cost of electrode power requirements (but not GWTP power) for years 1 & 2 of the heatup and the power requirements of the GWTP for years 3 & 4.
   For years 5 thru 7 of the thermal options the power is from the grid.
3. All power for the P&T option is electrical from the grid (no gas).

John Spear
06/29/01 09:32 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: heron@steamtech.com
Subject: Natural Gas prices for CD estimate - McCormick & Baxter

Harry,

I looked up some reports and projections done by the Energy Information Administration which is within the Dept of Energy. Their report attached which is entitled "US Natural Gas Markets: Recent Trends and Prospects for the Future" talks about the recent spike in gas prices and why they happened. They project (on page 5 of 7 of the Executive Summary) prices to moderate by 2002 to 4.43 per MMBTU. This article is informative but may still be a bit pessimistic. Another publication of the EIA is Table 14 (attached) which projects prices delivered to Industrial Users out to the year 2016. It seems to project pricing in the range of an average of $3.22 to $3.40 per 1000 CFT or about $3.00 to $3.13 per MMBTU over the next 10 years (in 1999 dollars). These are average projections for the whole USA . Another table I got from their website showed average 1999 pricing to Industrial users in California was $3.26 per Thousand CFT while the average for the USA was 3.11. This indicates that the price to California users is somewhat higher than the national average even before the 2000 to 2001 price anomalies kicked in.

In summary I think the rate we are using at $2.50 is unsustainable. Probably could go with the long term projections of Table 14 which would put our price around $3.30 plus about 5% inflation to 2001 or a number at $3.47 or so. (All prices on the Table are 1999 dollars.)

The article, "US Natural Gas Markets.....", is a good justification for not using any of the prices experienced in the last year or so because it explains the breakdown of the El Paso gas line coming into New Mexico and restricting capacity to California and also the reluctance of gas suppliers to sell to PG&E and the other Electricity Co. that was going broke. (The long term projections of Table 14 may even be high because their demand projections include a 3.6% growth or something like that for GDP. I believe the growth of the last year has actually been less than 2%.)

Take a look at the reports and let's adjust the gas costs to something that is probably more in line with government projections. We'd have somewhere to hang our hats at least.

Annual Energy Outlook 2001 - Forecast Comparisons TE> hruler01.gif eialogo3.gif

These files are something of a mystery to me. I saved the files from the doe website but the Table 4 is in the "Annual Energy Outlook 2001..." and the US Natural Gas Markets....." report is the other two files. If you have a problem with them I will fax or give you the website.

Jack

eia.doe.gov

Energy Information Administration

Official Energy Statistics from the U.S. Government

Search

by Google: GO

- Energy A-Z
- What's New
- About Us / Jobs
- Press Releases
- Kid's Page
- Publications
- Historical Data
- Sign Up for Email Updates
- Contact Experts
- Energy Links
- Presentations
- Energy Events
- Privacy/Security

How do you want to access energy information?

Click for a text menu

Or would you like to access specific subject areas?

Fea
Status
Califor
Situati
Gasoli
Fuel U
U.S. Na
Market
Trends
Prospe
Future
Short-
Weekl
Status
Natura
Update
Electri
Restru
Energy
Rankin

F
Pu
Recent
Statist
Annual
Projec

Need Help?

phone: 202-586-8800
email: infoctr@eia.doe.gov
Specialized Information Services
For Technical Problems
phone: 202-586-8959
email: wmaster@eia.doe.gov
Energy Information Administration, EI 30
1000 Independence Avenue, SW
Washington, DC 20585

Home | Petroleum | Gasoline | Diesel | Natural Gas | Electricity | Coal | Nuclear | Renewables
Alternative Fuels | Prices | States | International | Country Analysis Briefs
Environment | Analyses | Forecasts | Processes | Sectors

Page last modified on 06/13/2001 12:25:21

DOE/EIA-0383(2001)

Annual Energy Outlook 2001

With Projections to 2020

December 2000

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

This publication is on the WEB at:
www.eia.doe.gov/oiaf/aeo/

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the U.S. Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

For Further Information . . .

The *Annual Energy Outlook 2001* (*AEO2001*) was prepared by the Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, under the direction of Mary J. Hutzler (mhutzler@eia.doe.gov, 202/586-2222), Director, Office of Integrated Analysis and Forecasting; Susan H. Holte (sholte@eia.doe.gov, 202/586-4838), Director, Demand and Integration Division; James M. Kendell (jkendell@eia.doe.gov, 202/586-9646), Director, Oil and Gas Division; Scott Sitzer (ssitzer@eia.doe.gov, 202/586-2308), Director, Coal and Electric Power Division; and Andy S. Kydes (akydes@eia.doe.gov, 202/586-2222), Senior Modeling Analyst.

For ordering information and questions on other energy statistics available from EIA, please contact EIA's National Energy Information Center. Addresses, telephone numbers, and hours are as follows:

National Energy Information Center, EI-30
Energy Information Administration
Forrestal Building
Washington, DC 20585

Telephone: 202/586-8800
FAX: 202/586-0727
TTY: 202/586-1181
9 a.m. to 5 p.m., eastern time, M-F

E-mail: infoctr@eia.doe.gov
World Wide Web Site: http://www.eia.doe.gov/
FTP Site: ftp://ftp.eia.doe.gov/

Specific questions about the information in this report may be directed to:

Overview, Carbon Dioxide Emissions	Susan H. Holte (sholte@eia.doe.gov, 202/586-4838)
Economic Activity	Ronald Earley (rearley@eia.doe.gov, 202/586-1398)
International Oil Markets	G. Daniel Butler (gbutler@eia.doe.gov, 202/586-9503)
Residential Demand	John Cymbalsky (jcymbals@eia.doe.gov, 202/586-4815)
Commercial Demand	Erin Boedecker (eboedeck@eia.doe.gov, 202/586-4791)
Industrial Demand	T. Crawford Honeycutt (choneycu@eia.doe.gov, 202/586-1420)
Transportation Demand	David Chien (dchien@eia.doe.gov, 202/586-3994)
Electricity Generation, Capacity	J. Alan Beamon (jbeamon@eia.doe.gov, 202/586-2025)
Electricity Prices	Lori Aniti (laniti@eia.doe.gov, 202/586-2867)
Nuclear Energy	Laura Martin (lmartin@eia.doe.gov, 202/586-1494)
Renewable Energy	Thomas Petersik (tpetersi@eia.doe.gov, 202/586-6582)
Oil and Gas Production	Ted McCallister (tmccalli@eia.doe.gov, 202/586-4820)
Natural Gas Markets	Phylhs Martin (pmartin@eia.doe.gov, 202/586-9592)
Oil Refining and Markets	Stacy MacIntyre (smacinty@eia.doe.gov, 202/586-9795)
Coal Supply and Prices	Michael Mellish (mmellish@eia.doe.gov, 202/586-2136)

AEO2001 will be available on the EIA web site at www.eia.doe.gov/oiaf/aeo/ by December 22, 2000. Assumptions underlying the projections and tables of regional and other detailed results will also be available on December 22, 2000, at web sites www.eia.doe.gov/oiaf/assumption/ and /supplement/. Model documentation reports for the National Energy Modeling System (NEMS) and the report *NEMS: An Overview* are available at web site www.eia.doe.gov/bookshelf/docs.html.

Other contributors to the report include Bruce Bawks, Joseph Benneche, Robert Eynon, Edward Flynn, Mark Friedman, Zia Haq, James Hewlett, Jeff Jones, Diane Kearney, Paul Kondis, Thomas Leckey, Han-Lin Lee, James Lockhart, Chetha Phang, Eugene Reiser, Laurence Sanders, David Schoeberlein, Dan Skelly, Kay Smith, Brian Unruh, Dana Van Wagener, Steven Wade, Peggy Wells, and Thomas White.

Preface

The *Annual Energy Outlook 2001* (*AEO2001*) presents midterm forecasts of energy supply, demand, and prices through 2020 prepared by the Energy Information Administration (EIA). The projections are based on results from EIA's National Energy Modeling System (NEMS).

The report begins with an "Overview" summarizing the *AEO2001* reference case. The next section, "Legislation and Regulations," discusses evolving legislative and regulatory issues. "Issues in Focus" discusses the macroeconomic projections, world oil and natural gas markets, oxygenates in gasoline, distributed electricity generation, electricity industry restructuring, and carbon dioxide emissions. It is followed by the analysis of energy market trends.

The analysis in *AEO2001* focuses primarily on a reference case and four other cases that assume higher and lower economic growth and higher and lower world oil prices than in the reference case. Forecast tables for those cases are provided in Appendixes A through C. Alternative cases explore the impacts of varying key assumptions in NEMS—e.g., technology penetration. The major results for the alternative cases are shown in Appendix F. Appendix G briefly describes NEMS, the *AEO2001* assumptions, and the alternative cases.

The *AEO2001* projections are based on Federal, State, and local laws and regulations in effect on July 1, 2000. Pending legislation and sections of existing legislation for which funds have not been appropriated are not reflected in the forecasts. Historical data used for the *AEO2001* projections were the most current available as of July 31, 2000, when most 1999 data but only partial 2000 data were available. Historical data are presented in this report for comparative purposes; documents referenced in the source notes should be consulted for official data values. The projections for 2000 and 2001 incorporate the short-term projections from EIA's September 2000 *Short-Term Energy Outlook*.

The *AEO2001* projections are used by Federal, State, and local governments, trade associations, and other planners and decisionmakers in the public and private sectors. They are published in accordance with Section 205c of the Department of Energy Organization Act of 1977 (Public Law 95 91), which requires the EIA Administrator to prepare annual reports on trends and projections for energy use and supply.

The projections in *AEO2001* are not statements of what will happen but of what might happen, given the assumptions and methodologies used. The projections are business-as-usual trend forecasts, given known technology, technological and demographic trends, and current laws and regulations. Thus, they provide a policy-neutral reference case that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes. All laws are assumed to remain as currently enacted; however, the impacts of emerging regulatory changes, when defined, are reflected.

Because energy markets are complex, models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior. Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Behavioral characteristics are indicative of real-world tendencies rather than representations of specific outcomes.

Energy market projections are subject to much uncertainty. Many of the events that shape energy markets are random and cannot be anticipated, including severe weather, political disruptions, strikes, and technological breakthroughs. In addition, future developments in technologies, demographics, and resources cannot be foreseen with any degree of certainty. Many key uncertainties in the *AEO2001* projections are addressed through alternative cases.

EIA has endeavored to make these projections as objective, reliable, and useful as possible; however, they should serve as an adjunct to, not a substitute for, analytical processes in the examination of policy initiatives.

The Office of Integrated Analysis and Forecasting dedicates this report in memory of Richard Newcombe (1941-2000). Richard worked on the coal forecasts in past AEOs; his expertise and understanding of the coal industry, as well as his attention to detail, are greatly missed.

Contents

Page

Overview 1
Legislation and Regulations 9
Introduction 10
Nitrogen Oxide Emission Caps 11
FERC Order 2000 11
Updates on State Renewable Portfolio Standards and Renewable Energy Mandates 12
FERC Order 637 12
Royalty Rules 13
Tier 2 Vehicle Emissions and Gasoline Sulfur Standards 14
Heavy-Duty Vehicle Emissions and Diesel Fuel Quality Standards 15
Banning or Reducing the Use of MTBE in Gasoline 15
Proposed Changes to RFG Oxygen Standard 16
Proposed Limits on Benzene in Gasoline 16
Low-Emission Vehicle Program 17
Appliance Efficiency Standards 18
Petroleum Reserves 19
Issues in Focus 21
Macroeconomic Forecasting with the Revised National Income and Product Accounts (NIPA) 22
World Oil Demand and Prices 27
Natural Gas Supply Availability 28
Phasing Out MTBE in Gasoline 35
Distributed Electricity Generation Resources 37
Restructuring of State Retail Markets for Electricity 41
Carbon Dioxide Emissions in *AEO2001* 45
Market Trends 55
Trends in Economic Activity 56
Economic Growth Cases 57
International Oil Markets 58
Energy Demand 61
Residential Sector Energy Demand 63
Commercial Sector Energy Demand 64
Industrial Sector Energy Demand 65
Transportation Sector Energy Demand 67
Energy Demand in Alternative Technology Cases 69
Electricity 72
Electricity Sales 72
Electricity Generating Capacity 73
Electricity Prices 74
Electricity Generation 75
Nuclear Power 76
Electricity Alternative Cases 77
Electricity from Renewable Sources 79
Oil and Natural Gas 81
Oil and Gas Prices 81
Oil and Gas Reserve Additions 82
Natural Gas Production and Imports 83
Natural Gas Consumption 84
Natural Gas Prices 85
Oil and Gas Alternative Cases 86
Oil Production and Consumption 88
Petroleum Imports and Refining 89
Refined Petroleum Products 90

Contents

Market Trends (continued) Page

Coal 92
Coal Production and Prices 92
Coal Mining Labor Productivity 93
Coal Transportation Costs 94
Coal Consumption 95
Coal Exports 96
Emissions 97
Carbon Dioxide and Methane Emissions 97
Emissions from Electricity Generation 99

Forecast Comparisons 101

List of Acronyms 112

Notes and Sources 113

Appendixes
A. Reference Case Forecast 127
B. Economic Growth Case Comparisons 155
C. Oil Price Case Comparisons 183
D. Crude Oil Equivalency Summary 211
E. Household Expenditures 213
F. Results from Side Cases 216
G. Major Assumptions for the Forecasts 230
H. Conversion Factors 251

Index 253

Tables
1. Summary of results for five cases 7
2. Summer season NO_x emissions budgets for 2003 and beyond 11
3. Effective dates of appliance efficiency standards, 1988-2005 18
4. Historical revisions to growth rates of GDP and its major components, 1959-1998 22
5. Revisions to nominal GDP, 1959-1998 23
6. Revisions to nominal GDP for 1998 23
7. Historical growth in GDP, the labor force, productivity and energy intensity 23
8. Forecast comparison of key macroeconomic variables 25
9. Cost and performance of generic distributed generators 38
10. Projected installed costs and electrical conversion efficiencies for distributed generation technologies by year of introduction and technology, 2000-2020 39
11. Costs of industrial cogeneration systems, 1999 and 2020 40
12. New car and light truck horsepower ratings and market shares, 1990-2020 67
13. Costs of producing electricity from new plants, 2005 and 2020 75
14. Technically recoverable U.S. oil and gas resources as of January 1, 1999 81
15. Natural gas and crude oil drilling in three cases, 1999-2020 82
16. Transmission and distribution revenues and margins, 1970-2020 85
17. Components of residential and commercial natural gas end-use prices, 1985-2020 85
18. Petroleum consumption and net imports in five cases, 1999 and 2020 89
19. Forecasts of economic growth, 1999-2020 102
20. Forecasts of world oil prices, 2000-2020 102
21. Forecasts of average annual growth rates for energy consumption 103
22. Forecasts of average annual growth in residential and commercial energy demand 103
23. Forecasts of average annual growth in industrial energy demand 103
24. Forecasts of average annual growth in transportation energy demand 104
25. Comparison of electricity forecasts 105
26. Comparison of natural gas forecasts 107
27. Comparison of petroleum forecasts 109
28. Comparison of coal forecasts 111

Figures **Page**

1. Fuel price projections, 1999-2020: *AEO2000* and *AEO2001* compared 2
2. Energy consumption by fuel, 1970-2020 4
3. Energy use per capita and per dollar of gross domestic product, 1970-2020 5
4. Electricity generation by fuel, 1970-2020 5
5. Energy production by fuel, 1970-2020 6
6. Net energy imports by fuel, 1970-2020 6
7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 6
8. Index of energy use per dollar of gross domestic product, 1960-1998 24
9. Annual growth in real gross domestic product: 21-year moving average, 1980-2020 24
10. Projected average annual growth in sectoral output, 1999-2020 25
11. Projected commercial delivered energy intensity by fuel, 1999-2020 26
12. Projected industrial energy intensity by fuel, 1999-2020 26
13. Projected new light-duty vehicle and on-road stock fuel efficiency, 1999-2020 27
14. Refiner acquisition cost of imported crude oil, 1997-2000 27
15. World oil supply and demand forecast in the AEO2001 reference case, 1995-2020 28
16. Net U.S. imports of natural gas, 1970-2020 30
17. Lower 48 natural gas wells drilled, 1970-2020 31
18. Technically recoverable U.S. natural gas resources as of January 1, 1999 32
19. Lower 48 end-of-year natural gas reserves, 1990-2020 32
20. Lower 48 natural gas production in three resource cases, 2000-2020 33
21. Average lower 48 natural gas wellhead prices in three resource cases, 2000-2020 33
22. Lower 48 natural gas production in three technology cases, 1970-2020 34
23. Major new U.S. natural gas pipeline systems, 1990-2000 35
24. Projected buildings sector electricity generation by selected distributed resources in the reference case, 2000-2020 40
25. Cogeneration capacity by type and fuel, 1999 and 2020 41
26. Average annual electricity prices for competitive and noncompetitive regions, 1995-2020 43
27. Projected average regional electricity prices, 2000 and 2020 44
28. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 45
29. U.S. carbon dioxide emissions per capita, 1990-2020 45
30. U.S. carbon dioxide emissions per unit of gross domestic product, 1990-2020 46
31. Projected U.S. energy consumption in three economic growth cases, 1990-2020 48
32. Projected U.S. carbon dioxide emissions in three economic growth cases, 1990-2020 49
33. Projected U.S. energy intensity in three economic growth cases, 1990-2020 49
34. Projected U.S. energy intensity in three technology cases, 1990-2020 50
35. Projected U.S. energy consumption in three technology cases, 1990-2020 50
36. Projected U.S. carbon dioxide emissions in three technology cases, 1990-2020 51
37. Projected average annual real growth rates of economic factors, 1999-2020 56
38. Projected sectoral composition of GDP growth, 1999-2020 56
39. Projected average annual real growth rates of economic factors in three cases, 1999-2020 57
40. Annual GDP growth rate for the preceding 21 years, 1970-2020 57
41. World oil prices in three cases, 1970-2020 58
42. OPEC oil production in three cases, 1970-2020 58
43. Non-OPEC oil production in three cases, 1970-2020 59
44. Persian Gulf share of worldwide oil exports in three cases, 1965-2020 59
45. Projected U.S. gross petroleum imports by source, 1999-2020 60
46. Projected worldwide refining capacity by region, 1999 and 2020 60
47. Primary and delivered energy consumption, excluding transportation use, 1970-2020 61
48. Energy use per capita and per dollar of gross domestic product, 1970-2020 61
49. Delivered energy use by fossil fuel and primary energy use for electricity generation, 1970-2020 62
50. Primary energy consumption by sector, 1970-2020 62
51. Residential primary energy consumption by fuel, 1970-2020 63
52. Residential primary energy consumption by end use, 1990, 1997, 2010, and 2020 63

Contents

Figures (continued) **Page**

53. Efficiency indicators for selected residential appliances, 1999 and 2020 64
54. Commercial nonrenewable primary energy consumption by fuel, 1970-2020 64
55. Commercial primary energy consumption by end use, 1999 and 2020 65
56. Industrial primary energy consumption by fuel, 1970-2020 65
57. Industrial primary energy consumption by industry category, 1994-2020 66
58. Industrial delivered energy intensity by component, 1994-2020 66
59. Transportation energy consumption by fuel, 1975, 1999, and 2020 67
60. Projected transportation stock fuel efficiency by mode, 1999-2020 67
61. Projected technology penetration by mode of travel, 2020 68
62. Projected sales of advanced technology light-duty vehicles by fuel type, 2010 and 2020 68
63. Projected variation from reference case primary energy use by sector in two alternative cases, 2010, 2015, and 2020 69
64. Projected variation from reference case primary residential energy use in three alternative cases, 2000-2020 69
65. Projected cost and investment for selected residential appliances in the best available technology case, 2000-2020 70
66. Present value of investment and savings for residential appliances in the best available technology case, 2000-2020 70
67. Projected variation from reference case primary commercial energy use in three alternative cases, 2000-2020 70
68. Projected industrial primary energy intensity in two alternative cases, 1994-2020 71
69. Projected changes in key components of the transportation sector in two alternative cases, 2020 .. 71
70. Population, gross domestic product, and electricity sales, 1965-2020 72
71. Annual electricity sales by sector, 1970-2020 72
72. Projected new generating capacity and retirements, 2000-2020 73
73. Projected electricity generation capacity additions by fuel type, including cogeneration, 2000-2020 73
74. Fuel prices to electricity generators, 1990-2020 74
75. Average U.S. retail electricity prices, 1970-2020 74
76. Projected electricity generation costs, 2005 and 2020 75
77. Projected electricity generation by fuel, 1999 and 2020 75
78. Nuclear power plant capacity factors, 1973-2020 76
79. Projected operable nuclear capacity in three cases, 1995-2020 76
80. Projected electricity generation costs by fuel type in two advanced nuclear cost cases, 2005 and 2020 77
81. Projected cumulative new generating capacity by type in two cases, 1999-2020 77
82. Projected cumulative new generating capacity by technology type in three economic growth cases, 1999-2020 78
83. Projected cumulative new generating capacity by technology type in three fossil fuel technology cases, 1999-2020 78
84. Grid-connected electricity generation from renewable energy sources, 1970-2020 79
85. Projected nonhydroelectric renewable electricity generation by energy source, 2010 and 2020 79
86. Projected nonhydroelectric renewable electricity generation by energy source in two cases, 2020 .. 80
87. Wind-powered electricity generating capacity in two cases, 1985-2020 80
88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 81
89. U.S. petroleum consumption in five cases, 1970-2020 81
90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 81
91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 82
92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 82
93. Lower 48 crude oil reserve additions in three cases, 1970-2020 82
94. Natural gas production by source, 1990-2020 83
95. Natural gas production, consumption, and imports, 1970-2020 83
96. Natural gas consumption by sector, 1990-2020 84

Figures (continued)

Page

97. Projected pipeline capacity expansion by Census division, 1999-2020 84
98. Projected pipeline capacity utilization by Census division, 1999 and 2020 84
99. Natural gas end-use prices by sector, 1970-2020 85
100. Wellhead share of natural gas end-use prices by sector, 1970-2020 85
101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 86
102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 86
103. Lower 48 crude oil production in three technology cases, 1970-2020 87
104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 87
105. Crude oil production by source, 1970-2020 88
106. Petroleum supply, consumption, and imports, 1970-2020 88
107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 89
108. Domestic refining capacity in three cases, 1975-2020 89
109. Petroleum consumption by sector, 1970-2020 90
110. Consumption of petroleum products, 1970-2020 90
111. U.S. ethanol consumption, 1993-2020 91
112. Components of refined product costs, 1999 and 2020 91
113. Coal production by region, 1970-2020 92
114. Average minemouth price of coal by region, 1990-2020 92
115. Coal mining labor productivity by region, 1990-2020 92
116. Labor cost component of minemouth coal prices, 1970-2020 93
117. Average minemouth coal prices in three mining cost cases, 1990-2020 93
118. Projected change in coal transportation costs in three cases, 1999-2020 94
119. Projected variation from reference case projections of coal demand in two economic growth cases, 2020 94
120. Electricity and other coal consumption, 1970-2020 95
121. Projected coal consumption in the industrial and buildings sectors, 2010 and 2020 95
122. Projected U.S. coal exports by destination, 2010 and 2020 96
123. Projected coal production by sulfur content, 2010 and 2020 96
124. Projected carbon dioxide emissions by sector, 2000, 2010, and 2020 97
125. Projected carbon dioxide emissions by fuel, 2000, 2010, and 2020 97
126. Projected carbon dioxide emissions from electricity generation by fuel, 2000, 2010, and 2020 98
127. Projected methane emissions from energy use, 2005-2020 98
128. Projected sulfur dioxide emissions from electricity generation, 2000-2020 99
129. Projected nitrogen oxide emissions from electricity generation, 2000-2020 99

Overview

Key Energy Issues to 2020

Currently, most attention in energy markets is focused on near-term issues of world oil supply and prices, U.S. natural gas prices, and the transition to restructured electricity markets in several regions of the country. The *Annual Energy Outlook 2001* (*AEO2001*) addresses the longer-term trends of electricity industry restructuring, fossil fuel supply and prices, and the impacts of economic growth on projected energy use and carbon dioxide emissions. *AEO2001* does not project short-term events, such as supply disruptions or severe weather.

The *AEO2001* projections assume a transition to full competitive pricing of electricity in States with specific deregulation plans—California, New York, New England, the Mid-Atlantic States, Illinois, Texas, Oklahoma, Michigan, Ohio, Arizona, New Mexico, and West Virginia. Other States are assumed to continue cost-of-service electricity pricing. A transition from regulated to competitive prices over a 10-year period from the beginning of restructuring in each region, and implementation of the provisions of California legislation regarding price caps, are assumed. Increased competition in electricity markets is also represented through assumed changes in the financial structure of the industry and efficiency and operating improvements.

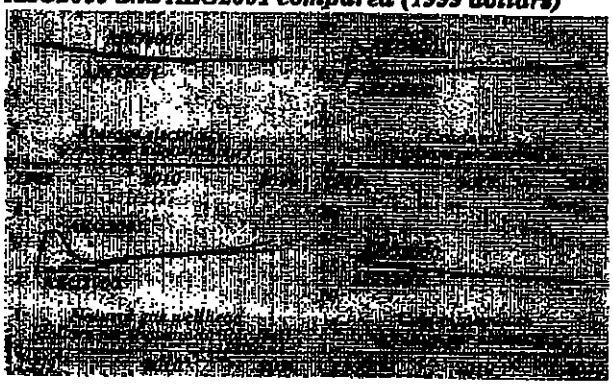
World oil prices fell sharply through most of 1997 and 1998, due in part to economic developments in East Asia and the resulting oversupply of oil. Beginning in 1999, actions by the Organization of Petroleum Exporting Countries (OPEC) and some non-OPEC countries to restrain oil production have increased world oil prices. U.S. natural gas prices have also increased in 2000 due to higher than expected demand and to tight supplies caused by reduced drilling in reaction to low prices in 1998. Oil and gas markets are addressed on pages 27 and 28.

The projected growth rate of the U.S. economy, measured by gross domestic product (GDP), is considerably higher in *AEO2001* than in *AEO2000*, an average annual rate of 3.0 percent from 1999 to 2020, compared with 2.1 percent in *AEO2000*. Although part of the upward revision results from statistical and definitional changes in the National Income and Product Accounts, the projections also reflect a more optimistic view of long-run economic growth, which results in higher forecasts of energy consumption and carbon dioxide emissions in *AEO2001* than in *AEO2000*. The macroeconomic projections are discussed on pages 22 and 56.

Prices

The average world oil price is projected to increase from $17.35 per barrel in 1999 (1999 dollars) to about $27.60 per barrel in 2000, falling to about $20.50 per barrel by 2003. In 2020, the projected price reaches $22.41 per barrel (Figure 1), similar to the *AEO2000* projection of $22.33 per barrel. Higher demand in the forecast is offset by higher resource estimates from the U.S. Geological Survey. Projected prices over the next several years are higher in *AEO2001* than in *AEO2000* due to the production cutbacks by OPEC and several non-OPEC nations, a lag in the response of non-OPEC producers to price increases, and renewed demand growth in Asia.

Figure 1. Fuel price projections, 1999-2020: AEO2000 and AEO2001 compared (1999 dollars)



World oil demand is projected to increase from 75.5 million barrels per day in 1999 to 117.4 million barrels per day in 2020—higher than the *AEO2000* projection of 112.4 million barrels per day—due to higher projected demand in the United States, the Middle East, the former Soviet Union, the Pacific Rim developing countries, and China. Projected growth in production in both OPEC and non-OPEC nations leads to relatively slow projected growth of prices through 2020. OPEC oil production is expected to reach 57.6 million barrels per day in 2020, nearly double the 29.9 million barrels per day in 1999, assuming sufficient capital to expand production capacity. The United Nations resolution limiting Iraqi oil exports is assumed to remain in place through 2001. Once sanctions are lifted, Iraqi oil production is expected to reach 3.5 million barrels per day within 2 years and about 5 million barrels per day within a decade.

The June 2000 recoverable oil resources assessment by the U.S. Geological Survey raised world resources by about 700 billion barrels from the 1994 assessment. As a result, non-OPEC oil production is expected to increase from 44.8 million barrels per day to 59.5 million barrels per day between 1999 and 2020, or 2.9 million barrels per day higher than in *AEO2000*. Production from the Caspian Basin is expected to reach 6 million barrels per day by 2020 with continued expansion of production from the offshore regions of West Africa and the North Sea. Both Brazil and Colombia are expected to be producing 1 million barrels per day before 2005, and production in Mexico and Canada is also expected to increase.

The average wellhead price of natural gas is projected to increase from $2.08 per thousand cubic feet in 1999 to about $3.30 per thousand cubic feet in 2000 and 2001, then decline through 2004. The projected price reaches $3.13 per thousand cubic feet in 2020, $0.28 per thousand cubic feet higher than in *AEO2000*, due to higher projected demand. Price increases are expected to be slowed by technological improvements in natural gas exploration and production. Average delivered prices are projected to increase at a slower rate than the wellhead price due to assumed cost reductions from efficiency improvements in the industry.

In *AEO2001*, the average minemouth price of coal is projected to decline from $16.98 per ton in 1999 to $12.70 per ton in 2020, the same price projected in *AEO2000*. Through 2020, the price is expected to decline due to increasing productivity in mining, a shift to lower-cost western production, and competitive pressures on labor costs.

Average electricity prices are projected generally to decline from 6.7 cents per kilowatthour in 1999 to 6.0 cents in 2020, increasing slightly at the end of the forecast due to rising natural gas prices. In 2020, the projected price is slightly higher than the 5.9 cents per kilowatthour projected in *AEO2000*. Higher projections for natural gas prices and for electricity demand—which would require more investment in new generating capacity—lead to the higher price projections. Electricity industry restructuring is expected to contribute to lower prices through reductions in operating and maintenance, administrative, and other costs. Federal Energy Regulatory Commission actions on open access and other changes for competitive markets enacted by some State public utility commissions are included in the projections, as noted above. Because not all States have deregulated their electricity markets, the projections do not represent a fully restructured electricity market. State legislative actions to deregulate the electricity industry are discussed on page 41.

Consumption

Total energy consumption is projected to increase from 96.1 quadrillion British thermal units (Btu) to 127.0 quadrillion Btu between 1999 and 2020, an average annual increase of 1.3 percent. In 2020, this forecast is about 6 quadrillion Btu higher than projected in *AEO2000*, primarily because higher projected economic growth leads to higher demand forecasts in all end-use sectors.

Total residential energy consumption is projected to grow at an average rate of 1.2 percent per year, with the most rapid growth expected for computers, electronic equipment, and appliances. In 2020, the projected residential demand is 24.4 quadrillion Btu, 1.4 quadrillion Btu higher than in *AEO2000*. Higher projected economic growth results in higher forecasts for both disposable personal income and housing starts, increasing equipment purchases and raising the projected housing stock in 2020 by 1.5 percent. *AEO2001* also forecasts that new houses will become larger over time.

Commercial energy demand is projected to grow at an average annual rate of 1.4 percent, reaching 20.8 quadrillion Btu in 2020, 2.6 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth in *AEO2001*, commercial floorspace is projected to grow more rapidly and, in 2020, is estimated to be 11 percent higher than projected in *AEO2000*. The most rapid increases in energy use are expected for computers, office equipment, and telecommunications and other equipment.

Industrial energy demand is projected to increase at an average rate of 1.0 percent per year, reaching 43.4 quadrillion Btu in 2020, 1.2 quadrillion Btu higher than in *AEO2000*. With higher projected economic growth, total industrial gross output is estimated to grow at an average annual rate of 2.6 percent from 1999 to 2020, compared with 1.9 percent in *AEO2000*; however, recent data indicate more rapid improvements in industrial energy intensity than previously estimated. Also, average annual growth in non-energy-intensive manufacturing is expected to be 3.3 percent, compared with 1.2 percent for energy-intensive manufacturing. Through 2020,

more rapid assumed declines in industrial energy intensity, compared with *AEO2000*, are projected to offset some of the increase in demand that might be expected with higher industrial output. Cogeneration capacity is projected to increase by 19 gigawatts by 2020, 10 gigawatts more than in *AEO2000*.

Energy demand for transportation is projected to grow at an average annual rate of 1.8 percent, to 38.5 quadrillion Btu in 2020, 1.0 quadrillion Btu higher than in *AEO2000*. In *AEO2001*, the projections for light-duty vehicle and freight travel are higher than in *AEO2000* as a result of higher projected growth in personal income and industrial output. Higher light-duty vehicle travel in the forecast is partially offset by higher vehicle efficiency. New vehicle efficiency in 2020 is projected to be higher by 0.9 and 1.9 miles per gallon for new cars and light trucks, respectively, than in *AEO2000*, due to a reevaluation of the competitive potential of advanced technology vehicles.

The projections incorporate efficiency standards for new energy-using equipment in buildings and for motors mandated through 1994 by the National Appliance Energy Conservation Act of 1987 and the Energy Policy Act of 1992, including the refrigerator and fluorescent lamp ballast standards that become effective in July 2001 and April 2005, respectively. These are the only standards that are finalized with effective dates and specific efficiency levels.

Electricity demand is projected to grow by 1.8 percent per year from 1999 through 2020, higher than the rate of 1.3 percent forecast for the same period in *AEO2000*. The higher demand projection results from higher projected economic growth and a reevaluation of the potential for growth in electricity use for a variety of residential and commercial appliances and equipment, including personal computers.

The overall demand for natural gas in the U.S. energy economy is projected to grow by 2.3 percent per year on average (Figure 2), from 21.4 trillion cubic feet in 1999 to 34.7 trillion cubic feet in 2020, primarily as a result of rapid projected growth in demand for electricity generation (excluding cogenerators), which is expected to triple between 1999 and 2020. The *AEO2001* forecast for total natural gas demand in 2020 is 3.2 trillion cubic feet higher than in *AEO2000*, mainly as a result of higher projected demand for natural gas in the electricity generation sector.

In *AEO2001*, total coal consumption is projected to increase from 1,035 million tons in 1999 to 1,297 million tons in 2020, an average increase of 1.1 percent per year. The 2020 projection is 18 million tons higher than in *AEO2000*, due to higher projected demand for industrial uses and for electricity generation, which constitutes about 90 percent of the demand for coal.

Petroleum demand is projected to grow from 19.5 million barrels per day in 1999 to 25.8 million in 2020—an average rate of 1.3 percent per year—led by growth in the transportation sector, which accounts for about 70 percent of U.S. petroleum consumption. Projected demand in 2020 is higher than in *AEO2000* by 730 thousand barrels per day primarily due to a higher projection for transportation fuel use.

Renewable fuel consumption, including ethanol for gasoline blending, is projected to grow at an average rate of 1.1 percent per year through 2020, primarily as a result of State mandates. In 2020, about 55 percent of renewables are used for electricity generation and the rest for dispersed heating and cooling, industrial uses (including cogeneration), and fuel blending. The *AEO2001* forecast for renewable energy demand in 2020 is 0.4 quadrillion Btu higher than in *AEO2000*, mainly due to higher projected use of biomass in the industrial sector.

Figure 2. Energy consumption by fuel, 1970-2020 (quadrillion Btu)

Energy Intensity

Between 1970 and 1986, energy intensity, measured as energy use per dollar of GDP, declined at an average annual rate of 2.3 percent as the economy shifted to less energy-intensive industries and more efficient technologies in light of energy price increases (Figure 3). With slower price increases (and price

declines in some sectors) and growth of more energy-intensive industries, intensity declines moderated to an average of 1.3 percent per year between 1986 and 1999. Energy intensity is projected to decline at an average annual rate of 1.6 percent through 2020 as efficiency gains and structural shifts in the economy offset the expected growth in demand for energy services. The projected improvement is more rapid than in *AEO2000*, due to more rapid projected efficiency improvements in the industrial sector and growth in the non-energy-intensive industries.

Figure 3. Energy use per capita and per dollar of gross domestic product, 1970-2020 (index, 1970 = 1)

Energy use per person generally declined from 1970 through the mid-1980s, then rose as energy prices fell. Per capita energy use is projected to increase slightly in the forecast as efficiency gains only partially offset higher demand for energy services.

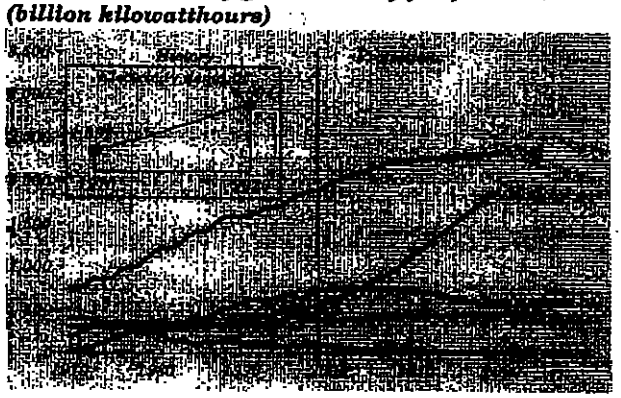
Electricity Generation

Electricity generation fueled by natural gas and coal is projected to increase through 2020 to meet growing demand for electricity and offset the projected retirement of existing nuclear units (Figure 4). The *AEO2001* projections for generation from natural gas, coal, and nuclear power are higher than in *AEO2000* as a result of higher projected electricity demand and improved operating costs and performance of nuclear plants. The share of natural gas generation is projected to increase from 16 percent in 1999 to 36 percent in 2020, and the coal share is projected to decline from 51 percent to 44 percent, because electricity industry restructuring favors the less capital-intensive and more efficient natural gas generation technologies.

Nuclear generating capacity is projected to decline from 1999 to 2020 but remains higher than in *AEO2000* due to a reevaluation of the costs of life extension and higher projected natural gas prices. Retirements of nuclear plants in the forecast are based on operating and life extension costs compared with the cost of new generating capacity. Of the 97 gigawatts of nuclear capacity available in 1999, 26 gigawatts is projected to be retired by 2020, and no new plants are expected to be constructed by 2020.

The use of renewable energy technologies for electricity generation is projected to grow slowly because of the relatively low costs of fossil-fired generation and because electricity restructuring favors less capital-intensive natural gas technologies over coal and baseload renewables. Where enacted, State renewable portfolio standards, which specify a minimum share of generation or sales from renewable sources, contribute to the expected growth of renewables. Total renewable generation, including cogenerators, is projected to increase by 0.7 percent per year and is similar to the projection in *AEO2000*.

Figure 4. Electricity generation by fuel, 1970-2020 (billion kilowatthours)



Production and Imports

U.S. crude oil production is projected to decline at an average annual rate of 0.7 percent from 1999 to 2020, to 5.1 million barrels per day. Advances in exploration and production technologies do not offset declining oil resources. This forecast is 0.2 million barrels per day lower in 2020 than in *AEO2000*. Projected production is higher in the earlier years of the forecast when projected prices are higher, contributing to lower production later. Projected increases in natural gas plant liquids production and refinery gains generally offset the decline in crude oil production (Figure 5). The share of petroleum demand met by net imports is projected to increase from 51 percent in 1999 (measured in barrels per day) to 64 percent in 2020, the same as in *AEO2000*, due to rising demand (Figure 6).

Figure 5. Energy production by fuel, 1970-2020 (quadrillion Btu)

Figure 6. Net energy imports by fuel, 1970-2020 (quadrillion Btu)

U.S. natural gas production is projected to increase from 18.7 trillion cubic feet in 1999 to 29.0 trillion cubic feet in 2020, an average annual rate of 2.1 percent, due to growing demand. Projected production is 2.6 trillion cubic feet higher in 2020 than in *AEO2000*. Net imports of natural gas, primarily from Canada, are projected to increase from 3.4 trillion cubic feet in 1999 to 5.8 trillion cubic feet in 2020. Net imports of liquefied natural gas are expected to increase to 0.7 trillion cubic feet by 2020 as two facilities in the United States—Elba Island, Georgia, and Cove Point, Maryland—are expected to reopen in 2003.

Coal production is projected to increase at an average annual rate of 0.9 percent, from 1,105 million tons in 1999 to 1,331 million tons in 2020, as projected domestic demand grows. Projected production in 2020 is 15 million tons higher than in *AEO2000*, due to higher demand. U.S. net coal exports are projected to decline through 2020, with European demand for U.S. coal expected to decline for environmental reasons and as a result of competition from other producers.

Renewable energy production is projected to increase from 6.6 quadrillion Btu in 1999 to 8.3 quadrillion Btu in 2020, with growth in geothermal, wind, biomass, and landfill gas generation, industrial biomass, and ethanol. Renewables production in 2020 is estimated to be 0.3 quadrillion Btu higher than in *AEO2000*, as a result of higher expected use of biomass in the industrial sector.

Carbon Dioxide Emissions

Carbon dioxide emissions from energy use are projected to increase at an average rate of 1.4 percent per year from 1,511 to 2,041 million metric tons carbon equivalent between 1999 and 2020 (Figure 7). Projected emissions in 2020 are higher by 62 million metric tons carbon equivalent than in *AEO2000*, due mainly to higher projected economic growth. Higher projected growth in households, commercial floorspace, industrial output, and disposable income leads to higher forecasts for end-use demand and electricity generation. Partly offsetting these trends are more rapid projected declines in industrial energy intensity and higher projected nuclear generation than in *AEO2000*.

Figure 7. Projected U.S. carbon dioxide emissions by sector and fuel, 1990-2020 (million metric tons carbon equivalent)

The projections do not include future legislative or regulatory actions that might be taken to reduce carbon dioxide emissions but do include certain voluntary actions to reduce energy demand and emissions. Carbon dioxide emissions and international negotiations for emissions reductions are discussed on pages 45 and 97.

Table 1. Summary of results for five cases

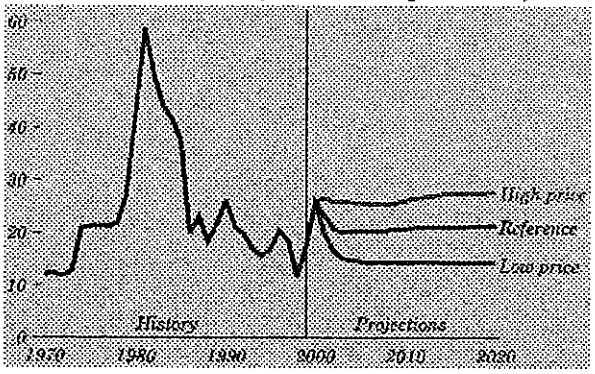
Sensitivity Factors	1998	1999	2020 Reference	2020 Low Economic Growth	2020 High Economic Growth	2020 Low World Oil Price	2020 High World Oil Price
Primary Production (quadrillion Btu)							
Petroleum	15.68	15.08	14.79	14.08	15.42	13.21	16.34
Natural Gas	19.19	19.16	29.79	27.44	31.17	28.99	29.80
Coal	23.76	23.09	26.95	25.97	29.42	26.20	27.66
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.62	6.58	8.31	7.91	8.75	8.19	8.37
Other	0.65	1.65	0.34	0.32	0.34	0.33	0.40
Total Primary Production	**73.10**	**73.35**	**86.30**	**81.64**	**91.40**	**83.02**	**88.67**
Net Imports (quadrillion Btu)							
Petroleum (including SPR)	20.95	21.12	35.22	32.18	38.76	39.57	32.38
Natural Gas	3.06	3.46	5.94	5.72	5.96	5.87	5.66
Coal/Other (- indicates export)	-1.41	-0.85	-0.47	-0.52	-0.36	-0.47	-0.47
Total Net Imports	**22.60**	**23.73**	**40.69**	**37.38**	**44.36**	**44.97**	**37.57**
Discrepancy	0.86	0.94	-0.04	0.05	-0.10	0.60	-0.17
Consumption (quadrillion Btu)							
Petroleum Products	37.16	38.03	50.59	46.73	54.82	52.74	49.49
Natural Gas	21.96	21.95	35.57	33.00	36.97	34.88	35.31
Coal	21.61	21.43	26.20	25.19	28.77	25.45	26.92
Nuclear Power	7.19	7.79	6.13	5.91	6.31	6.09	6.09
Renewable Energy	6.63	6.59	8.31	7.92	8.76	8.20	8.38
Other	0.29	0.34	0.23	0.23	0.23	0.23	0.23
Total Consumption	**94.84**	**96.14**	**127.03**	**118.98**	**135.86**	**127.39**	**126.42**
Prices (1999 dollars)							
World Oil Price (dollars per barrel)	12.02	17.35	22.41	21.16	23.51	15.10	28.42
Domestic Natural Gas at Wellhead (dollars per thousand cubic feet)	2.02	2.08	3.13	2.66	3.68	3.01	3.25
Domestic Coal at Minemouth (dollars per short ton)	18.02	16.98	12.70	12.79	12.80	12.84	12.87
Average Electricity Price (cents per kilowatthour)	6.8	6.7	6.0	5.6	6.4	5.9	6.1
Economic Indicators							
Real Gross Domestic Product (billion 1996 dollars)	8,516	8,876	16,515	14,757	18,202	16,565	16,474
(annual change, 1999-2020)	—	—	3.0%	2.5%	3.5%	3.0%	3.0%
GDP Chain-Type Price Index (Index, 1996=1.00)	1.029	1.045	1.680	1.907	1.472	1.674	1.686
(annual change, 1999-2020)	—	—	2.3%	2.9%	1.6%	2.3%	2.3%
Real Disposable Personal Income (billion 1996 dollars)	6,165	6,363	11,842	10,907	12,739	11,902	11,786
(annual change, 1999-2020)	—	—	3.0%	2.6%	3.4%	3.0%	3.0%
Gross Manufacturing Output (billion 1992 dollars)	3,704	3,749	6,726	6,149	7,735	6,730	6,724
(annual change, 1999-2020)	—	—	2.8%	2.4%	3.5%	2.8%	2.8%
Energy Intensity (thousand Btu per 1996 dollar of GDP)	11.14	10.84	7.70	8.07	7.47	7.69	7.68
(annual change, 1999-2020)	—	—	-1.6%	-1.4%	-1.8%	-1.6%	-1.6%
Carbon Dioxide Emissions (million metric tons carbon equivalent)	1,495	1,511	2,041	1,916	2,193	2,051	2,033
(annual change, 1999-2020)	—	—	1.4%	1.1%	1.8%	1.5%	1.4%

Notes: Specific assumptions underlying the alternative cases are defined in the Economic Activity and International Oil Markets sections beginning on page 56. Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, supplemental natural gas, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. Some refinery inputs appear as petroleum product consumption. Other consumption includes net electricity imports, liquid hydrogen, and methanol.

Sources: Tables A1, A19, A20, B1, B19, B20, C1, C19, and C20.

Oil Prices Are Expected To Remain Above Low 1998 Levels

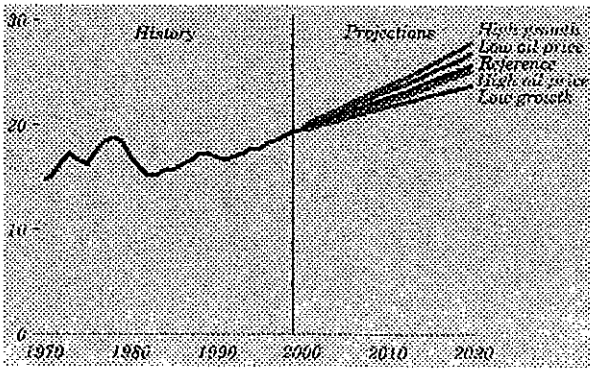
Figure 88. Lower 48 crude oil wellhead prices in three cases, 1970-2020 (1999 dollars per barrel)



Because domestic prices for crude oil are determined largely by the international market, recovery from the 1998 decline in world oil prices led to a steep increase in wellhead prices for crude oil in the lower 48 States in 1999 and 2000. After 2000, prices are projected to decline initially, then increase through the rest of the forecast. Prices are expected to remain above 1998 levels in all cases, with wellhead prices projected to decrease by 0.6 percent per year on average from 1999 to 2020 in the low world oil price case and to increase by 1.3 and 2.5 percent per year on average in the reference and high world oil price cases, respectively (Figure 88).

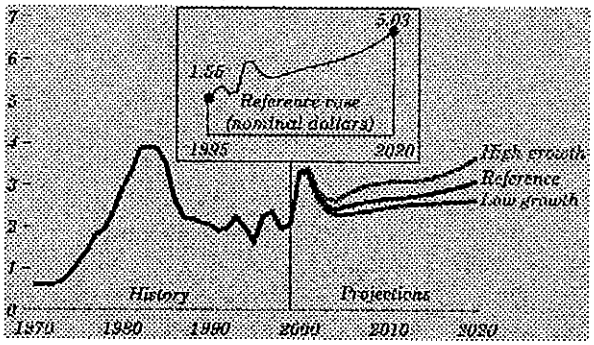
U.S. petroleum consumption is projected to rise in all the *AEO2001* cases (Figure 89). Total petroleum product supplied is projected to range from 23.8 million barrels per day in the low economic growth case to 28.0 million in the high growth case, as compared with 19.5 million barrels per day in 1999.

Figure 89. U.S. petroleum consumption in five cases, 1970-2020 (million barrels per day)



Rising Demand Increases Natural Gas Prices in All Economic Growth Cases

Figure 90. Lower 48 natural gas wellhead prices in three cases, 1970-2020 (1999 dollars per thousand cubic feet)



Wellhead prices for natural gas in the lower 48 States are projected to increase on average by 1.2, 2.0, and 2.8 percent per year in the low economic growth, reference, and high economic growth cases, respectively (Figure 90). In the reference case, gas prices are projected to increase from $2.08 per thousand cubic feet in 1999 to $3.13 in 2020. The increases reflect the rising demand projected for natural gas and its expected impact on the natural progression of the discovery process from larger and more profitable fields to smaller, less economical ones. The projected price increases also reflect more production expected from higher cost sources, such as unconventional gas recovery. Growth in lower 48 unconventional gas production is projected to range from 2.5 to 3.5 percent per year across cases, compared with a projected range of 2.3 to 2.7 percent per year for conventional sources. Technically recoverable resources (Table 14) are expected to remain more than adequate overall to meet the projected production increases.

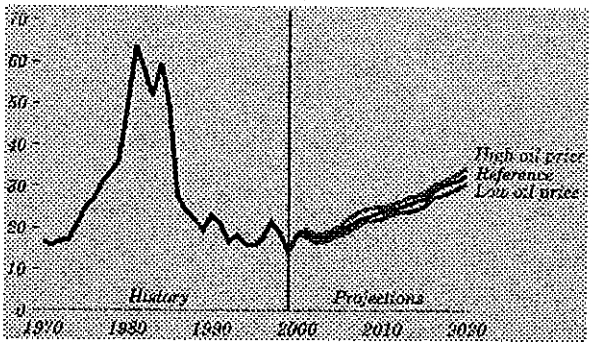
Although natural gas consumption (and thus production and prices) is projected to rise in all three cases, the price increases are expected to be tempered by the beneficial impacts of technological progress on both the discovery process and production operations.

Table 14. Technically recoverable U.S. oil and gas resources as of January 1, 1999

Total U.S. resources	Crude oil (billion barrels)	Natural gas (trillion cubic feet)
Proved	22	164
Unproved	121	1,117
Total	144	1,281

Rising Prices and Lower Drilling Costs Increase Well Completions

Figure 91. Successful new lower 48 natural gas and oil wells in three cases, 1970-2020 (thousand successful wells)



Both exploratory drilling and developmental drilling are projected to increase in the forecast (Table 15). With rising prices and declining drilling costs, crude oil and natural gas well completions are projected to increase on average by 3.7 and 4.3 percent per year in the low and high oil price cases, respectively, compared with 4.0 percent in the reference case (Figure 91). The high growth rates projected for oil and gas drilling reflect, in part, the low level of drilling activity in 1999.

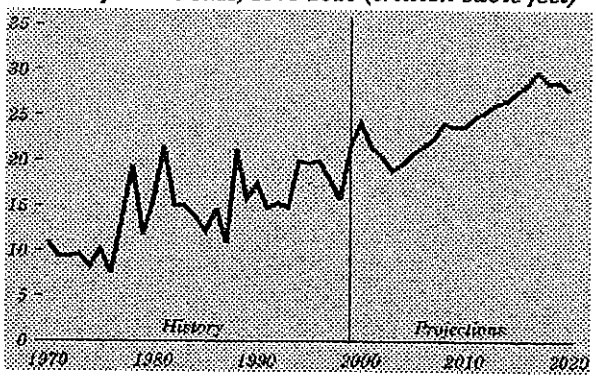
The productivity of natural gas drilling is not expected to decline as much as that of oil drilling, in part because total recoverable gas resources are more abundant than oil resources. At the projected production levels, however, undiscovered recoverable resources of conventional natural gas would decline rapidly in some areas, particularly in the onshore Gulf Coast and offshore Gulf of Mexico regions. The future overall productivity of both oil and gas drilling is necessarily uncertain, given the uncertainty associated with such factors as the extent of the Nation's oil and gas resources [*87*].

Table 15. Natural gas and crude oil drilling in three cases, 1999-2020 (thousand successful wells)

	1999	2000	2010	2020
Natural gas				
Low oil price case		12.8	16.5	22.2
Reference case	10.3	12.8	17.5	23.4
High oil price case		13.0	18.1	24.3
Crude oil				
Low oil price case		5.5	5.8	8.5
Reference case	4.1	5.5	6.5	9.4
High oil price case		5.5	7.0	10.2

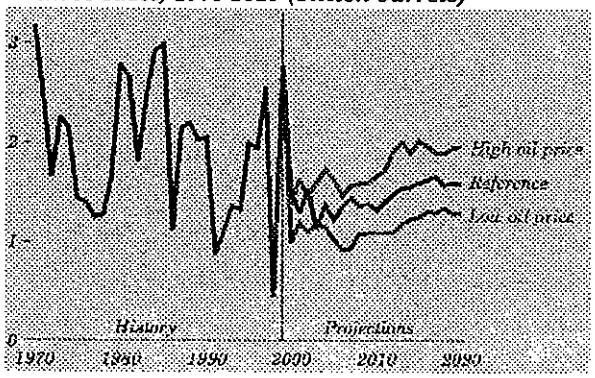
High Levels of Gas Reserve Additions Are Projected Through 2020

Figure 92. Lower 48 natural gas reserve additions in the reference case, 1970-2020 (trillion cubic feet)



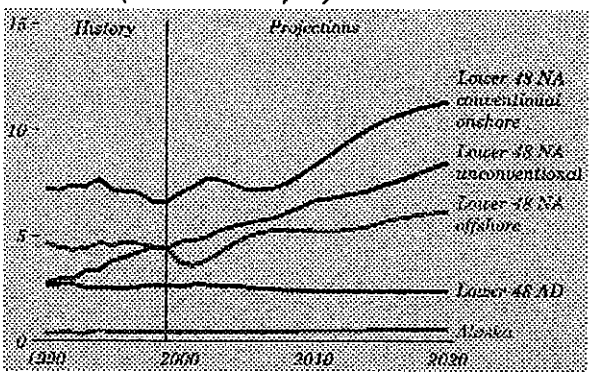
For most of the past two decades lower 48 production of both oil and natural gas has exceeded reserve additions, but the pattern for natural gas reversed from 1994 through 1997. Although reserve additions fell below production in 1998 with the decline in prices, they exceeded production again in 1999. After 2004, rising prices are projected to result in natural gas reserve additions that generally exceed production through 2020 (Figure 92), even with expected increases in demand. The relatively high projected levels of annual gas reserve additions through 2020 reflect an expected increase in exploratory and developmental drilling as a result of higher prices, as well as expected productivity gains from technology improvements comparable to those of recent years. For the most part, total lower 48 crude oil production is projected to continue to exceed total reserve additions (Figure 93), except in the later years in the high world oil price case.

Figure 93. Lower 48 crude oil reserve additions in three cases, 1970-2020 (billion barrels)



Significant New Finds Are Likely To Continue Increases in Gas Production

Figure 94. Natural gas production by source, 1990-2020 (trillion cubic feet)



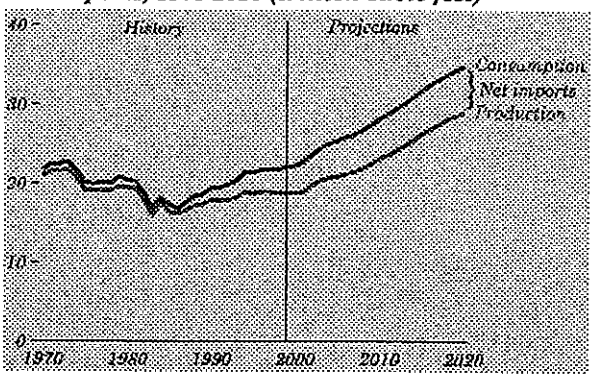
The continuing increase in domestic natural gas production in the forecast is expected to come primarily from lower 48 onshore nonassociated (NA) sources (Figure 94). Conventional onshore production is projected to grow rapidly from 2006 through 2020, increasing in share from 35.5 percent of total U.S. domestic production in 1999 to 39.2 percent of the total in 2020. Gas production from unconventional sources is projected to increase steadily over the forecast as a result of technology advances, playing a key role in meeting projected demand. Offshore production is projected to increase less rapidly but to remain a major source of domestic supply. Innovative use of cost-saving technology in recent years and the expected mid-term continuation of recent huge finds, particularly in the deep waters of the Gulf of Mexico, support the projections.

Natural gas production from Alaska is projected to grow by 1.5 percent per year through 2020, not including gas from the North Slope. The future of North Slope gas is uncertain, however. Current options under consideration include transporting the gas through a pipeline, converting it to liquefied natural gas, and converting it to synthetic petroleum products [*88*].

Production of associated-dissolved (AD) natural gas from lower 48 crude oil reservoirs generally declines in the projections, following the expected pattern of domestic crude oil production. AD gas is projected to account for 8.2 percent of total production in 2020, compared with 14.6 percent in 1999.

Net Imports of Natural Gas Grow in the Projections

Figure 95. Natural gas production, consumption, and imports, 1970-2020 (trillion cubic feet)



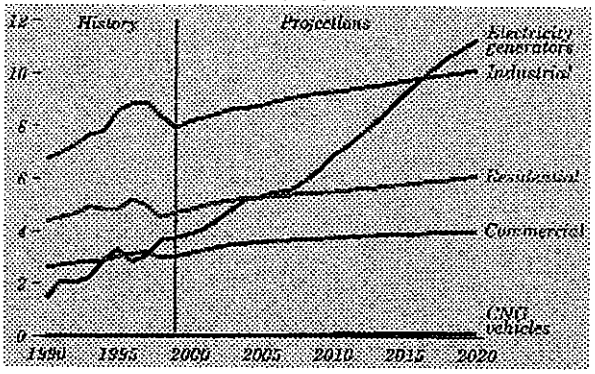
Net natural gas imports are expected to grow in the forecast (Figure 95) from 15.8 percent of total gas consumption in 1999 to 16.7 percent in 2020. Most of the increase is attributable to imports from Canada, which are projected to grow substantially. Most of the additional imports are expected to come from western Canada. In addition, new pipeline capacity is now providing access to eastern supplies. Natural gas from Sable Island, in the offshore Atlantic, began flowing on January 1, 2000.

Mexico has a considerable natural gas resource base, but its indigenous production is unlikely to increase sufficiently to satisfy rising demand. Since 1984, U.S. natural gas trade with Mexico has consisted primarily of exports. That trend is expected to continue throughout the forecast, especially in light of continuing additions to cross-border pipeline capacity. U.S. exports to Mexico are projected to grow from 60 billion cubic feet in 1999 to 520 billion cubic feet in 2020.

Imports of liquefied natural gas (LNG) are projected to increase by 8.0 percent per year on average, resulting in part from the expected reactivation of both the Elba Island terminal in Georgia and the Cove Point terminal in Maryland in 2003. LNG is not expected to grow beyond a regionally significant source of U.S. supply, however. LNG imports are projected to reach a level of 0.81 trillion cubic feet in 2020, compared with 0.16 trillion cubic feet in 1999.

Projected Increases in Natural Gas Use Are Led by Electricity Generators

Figure 96. Natural gas consumption by sector, 1990-2020 (trillion cubic feet)

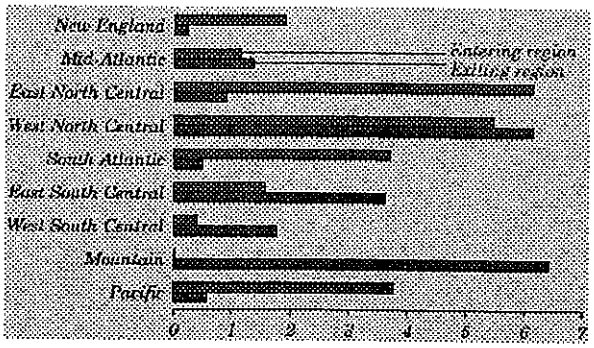


In all the *AEO2001* cases, total natural gas consumption is projected to increase from 1999 to 2020. The projections for domestic consumption in 2020 range from 32.2 trillion cubic feet per year in the low economic growth case to 36.1 trillion cubic feet in the high growth case, as compared with an estimated 21.4 trillion cubic feet in 1999. Although rising demand by electricity generators accounts for 57 percent of the increase in the reference case, growth is also expected in the residential, commercial, industrial, and transportation sectors (Figure 96). Natural gas consumption in the electricity generation sector is projected to grow steadily throughout the forecast as demand for electricity increases and retiring nuclear and older oil and gas steam plants are replaced by gas turbines and combined-cycle facilities.

In the reference case, natural gas consumption for electricity generation (excluding cogeneration) is projected to increase from 3.8 trillion cubic feet in 1999 to 11.3 trillion cubic feet in 2020. In 2017 electricity generation is projected to surpass the industrial sector as the largest consumer of natural gas. Although coal prices to the electricity generation sector are projected to fall throughout the forecast, lower capital costs, shorter construction lead times, higher efficiencies, and lower emissions are expected to give gas-fired generators an advantage over coal-fired plants for new capacity additions in most regions of the United States. Natural-gas-fired facilities are less capital-intensive than coal, nuclear, or renewable electricity generation plants. In addition, the environmental advantages of natural gas are expected to favor increased utilization of existing gas-fired power plants.

Gas Pipeline Capacity Expansion Is Needed To Serve New Markets

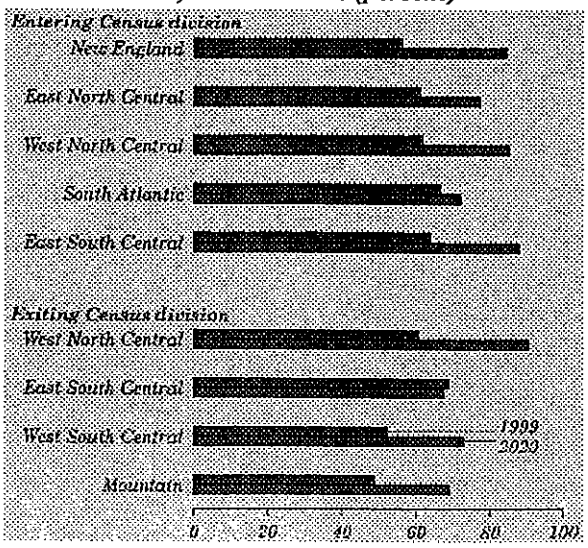
Figure 97. Projected pipeline capacity expansion by Census division, 1999-2020 (billion cubic feet per day)



Projected growth in natural gas consumption will require additional pipeline capacity. Expansion of interstate capacity (Figure 97) will be needed to provide access to new supplies and to serve expanding markets. Expansion is projected to proceed at an average rate of 1.0 percent per year in the forecast.

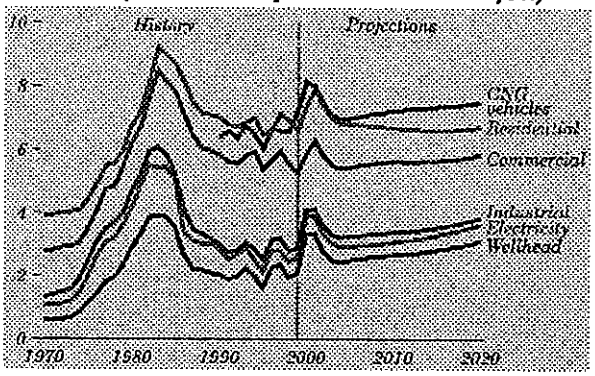
The greatest increases in capacity are expected along the corridors that provide access to Canadian, Gulf Coast, and Mountain region supplies and deliver them to the South Atlantic, Pacific, and Northeast regions. In all regions, growth in new pipeline construction is expected to be tempered by higher utilization of existing pipeline capacity (Figure 98).

Figure 98. Projected pipeline capacity utilization by Census division, 1999 and 2020 (percent)



Competitive Markets Keep Residential Gas Prices in Check

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



Consumer prices for natural gas in all the end-use sectors are projected to be higher in 2020 that they were in 1999 (Figure 99), but prices in the residential and transportation sectors are expected to remain within 5 percent of 1999 levels. The limited price increases in the forecast reflect expectations for declining distribution margins, due in part to anticipated efficiency improvements in an increasingly competitive market. Margins in the industrial sector are projected to remain relatively constant, and growth in end-use prices is expected to result mainly from wellhead price increases. In the electricity generation sector, expected increases in both pipeline margins and wellhead prices combine to yield a projected 1.6-percent average annual increase in end-use prices.

Compared with their rise and decline over the 1970 to 1999 period, transmission and distribution revenues in the natural gas industry are projected to grow relatively steadily from 2000 forward, increasing overall at an average rate of 1.1 percent per year (Table 16). Declines in margins are expected to be balanced by higher volumes.

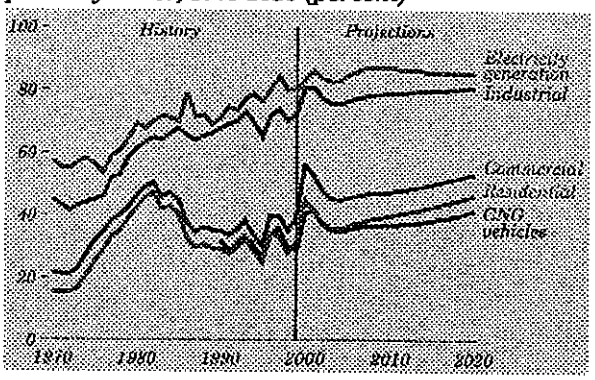
Table 16. Transmission and distribution revenues and margins, 1970-2020

	1970	1985	1999	2010	2015	2020
T&D revenues (billion 1999 dollars)	30.73	49.62	39.86	44.59	47.01	49.82
End-use consumption (trillion cubic feet)	19.21	15.97	21.41	28.05	31.61	34.73
Average margin* (1999 dollars per thousand cubic feet)	1.62	3.14	2.04	1.74	1.63	1.57

*Revenue divided by end-use consumption.

Distribution Costs Claim a Smaller Share of Residential Gas Prices

Figure 100. Wellhead share of natural gas end-use prices by sector, 1970-2020 (percent)



With distribution margins projected to decline, the wellhead shares of end-use prices generally increase in the forecast (Figure 100). The greatest impact is expected in the residential and commercial markets, where most customers purchase gas through local distribution companies (LDCs). In the electricity generation sector, the majority of customers do not purchase from distributors.

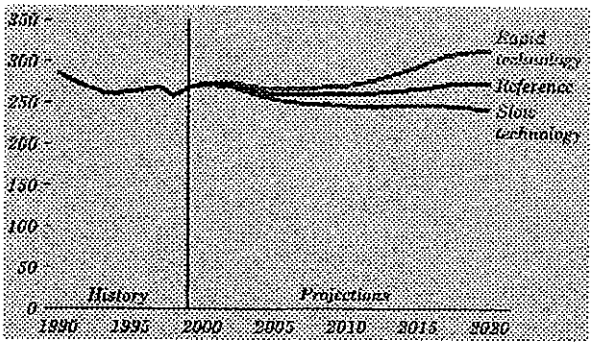
Changes have been seen historically in all components of end-use prices (Table 17). Pipeline margins dropped significantly between 1985 and 1999 with industry restructuring, and the decline is projected to continue through 2010. From 2010 to 2020, pipeline margins are projected to remain relatively flat. LDC margins in the residential and commercial sectors were above 1985 levels in 1999, but efficiency improvements and other impacts of restructuring are expected to exert downward pressure on distribution costs, and lower margins are projected for both the residential and commercial sectors in 2010 and 2020.

Table 17. Components of residential and commercial natural gas end-use prices, 1985-2020 (1999 dollars per thousand cubic feet)

Price Component	1985	1999	2010	2020
Wellhead price	3.38	2.08	2.69	3.13
Citygate price	5.05	3.10	3.60	4.04
Pipeline margin	1.67	1.02	0.91	0.91
LDC margin				
Residential	3.19	3.59	3.10	2.69
Commercial	2.36	2.39	2.05	1.82
End-use price				
Residential	8.24	6.69	6.70	6.73
Commercial	7.41	5.49	5.65	5.86

Technology Advances Could Improve Finding and Drilling Success Rates

Figure 101. Lower 48 crude oil and natural gas end-of-year reserves in three technology cases, 1990-2020 (quadrillion Btu)



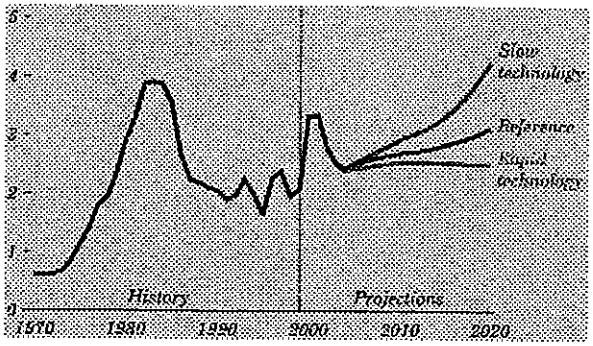
In the forecast, major advances in data acquisition, data processing, and the display and integration of seismic data with other geologic data—combined with lower cost computer power and experience gained with new techniques—are projected to continue putting downward pressure on costs while significantly improving finding and success rates. Effective use of improved exploration and production technologies to aid in the discovery and development of resources—particularly, unconventional gas and offshore deepwater fields—will be needed if new reserves are to replace those depleted by production.

Alternative cases assess the sensitivity of the projections to changes in success rates, exploration and development costs, and finding rates as a result of technological progress. The assumed technology improvement rates increase and decrease by 25 percent in the rapid and slow technology cases, which are analyzed as fully integrated model runs. All other parameters in the model are at their reference case values, including technology parameters in other energy markets, parameters affecting foreign oil supply, and assumptions about foreign natural gas trade, excluding Canada.

Although gas reserves are projected to make up a slightly larger share of the total in the reference case, total hydrocarbon reserve additions are expected to offset production, keeping total reserves essentially constant throughout the forecast (Figure 101). By 2020, reserves are projected to be 14.4 percent higher in the rapid technology case than in the reference case and 11.3 percent lower in the slow technology case.

Gas Price Projections Change With Technology Assumptions

Figure 102. Lower 48 natural gas wellhead prices in three technology cases, 1970-2020 (1999 dollars per thousand cubic feet)



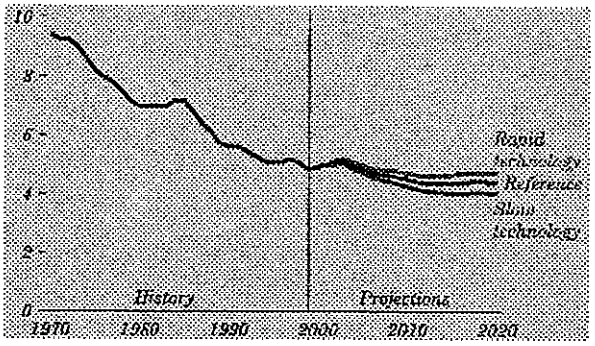
The natural gas price projections are highly sensitive to changes in assumptions about technological progress (Figure 102). Lower 48 wellhead prices are projected to increase at an average annual rate of 3.4 percent in the slow technology case, compared with only 2.0 percent in the reference case, over the projection period. In the rapid technology case, average natural gas wellhead prices are projected to remain relatively flat through 2020 at about $2.50 per thousand cubic feet.

Through 2003, the projections of both price and production levels for lower 48 oil and natural gas are almost identical in the reference case and the two technological progress cases. By 2020, however, natural gas prices are projected to be 35.1 percent higher (at $4.23 per thousand cubic feet) in the slow technology case and 20.1 percent lower (at $2.50 per thousand cubic feet) in the rapid technology case than the reference case level of $3.13 per thousand cubic feet.

Unlike the projections for natural gas prices, those for lower 48 average wellhead prices for crude oil do not vary significantly across the technology cases. In both the rapid and slow technology cases, the projections for crude oil prices vary from the reference case projections by at most $0.14 per barrel. Domestic oil prices are determined largely by the international market; changes in U.S. oil production do not constitute a significant volume relative to the global market.

More Rapid Technology Advances Could Raise Oil Production Slightly

Figure 103. Lower 48 crude oil production in three technology cases, 1970-2020 (million barrels per day)



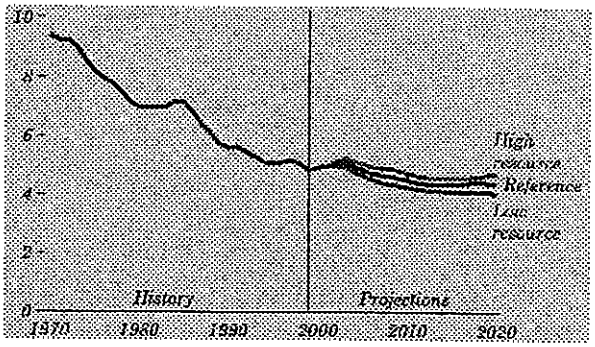
Projections for domestic oil production also are sensitive to changes in technological progress assumptions (Figure 103). In comparison with the projected lower 48 production level of 4.4 million barrels per day in 2020 in the reference case, oil production is projected to increase to 4.7 million barrels per day in the rapid technology case and to decrease to 4.0 million barrels per day in the slow technology case.

Given the assumption that changes in the levels of technology affect only U.S. oil producers, total oil supply adjusts to the variations in technological progress assumptions primarily through changes in imports of crude oil and other petroleum products. Net imports in 2020 are projected to range from a low of 16.1 million barrels per day in the rapid technology case to a high of 17.4 million barrels per day in the slow technology case.

Offshore oil production in the lower 48 States shows more sensitivity than onshore production to changes in technological progress assumptions, because large deepwater fields that are not economically feasible in the slow technology case are projected to become profitable in the rapid technology case. Cumulative offshore production from 1999 through 2020 is projected to be about 745 million barrels (4.9 percent) higher in the rapid technology case than in the reference case and 922 million barrels (6.0 percent) lower in the slow technology case than in the reference case. For onshore production, in contrast, the projected differences are only 3.5 percent and 3.6 percent. The projections for Alaskan oil production vary by about 3.9 percent from the reference case in both the rapid and slow technology cases.

Oil Production Forecasts Vary, Depending on Resource Estimates

Figure 104. Lower 48 crude oil production in three oil and gas resource cases, 1970-2020 (million barrels per day)



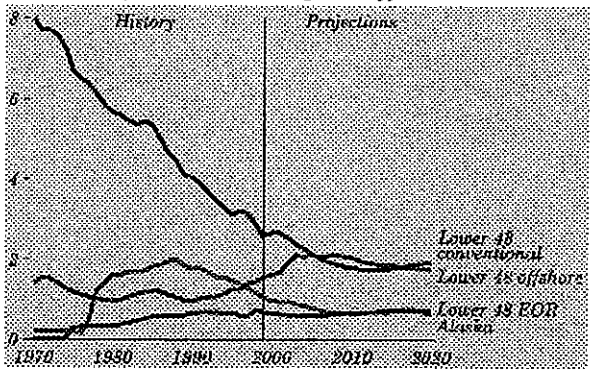
Another important assumption for the projections of domestic oil and gas resources is the size of the domestic resource base. Two alternative cases were used to evaluate the impacts of uncertainty in the resource estimates. In the high and low resource sensitivity cases, the estimates for both undiscovered technically recoverable resources and inferred reserves for conventional onshore and offshore production were increased and decreased, respectively, by 20 percent. As in the other *AEO2001* cases, resources in areas currently restricted from exploration and development were excluded from the resource assumption.

In the high resource case, both oil production levels and industry profits are projected to increase over those projected in the reference case. Lower 48 crude oil production is projected to reach 4.8 million barrels per day in 2020, as compared with 4.4 million barrels per day projected in the reference case (Figure 104). The corresponding projection in the low resource case is 4.0 million barrels per day.

The variations in oil production projections in the two resource sensitivity cases lead to similar variations in the projections of oil import dependence. In the high resource case, with higher projected production levels, net petroleum imports are projected to make up 62 percent of domestic supply in 2020, compared with 64 percent in the reference case. In the low resource case, with lower projected domestic production, imports are projected to make up 68 percent of domestic supply.

Domestic Crude Oil Production Continues To Decline

Figure 105. Crude oil production by source, 1970-2020 (million barrels per day)

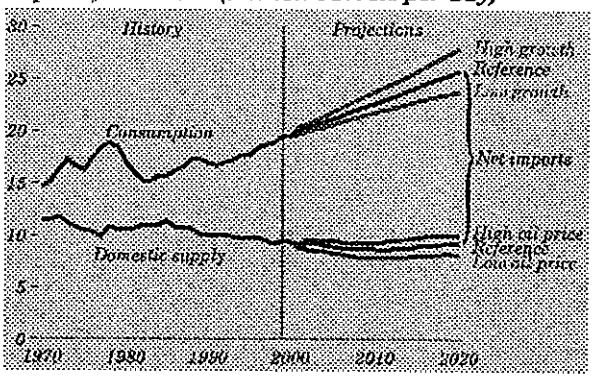


Domestic crude oil production is projected to remain relatively stable from 1999 through 2003 as a result of a favorable price environment and increased success of offshore drilling (Figure 105). A decline in production is projected from 2004 through 2010, followed by another period of projected stable production levels through 2020 as a result of rising prices and continuing improvements in technology [*89*]. In 2020, the projected domestic production level of 5.1 million barrels per day is 0.8 million barrels per day less than the 1999 level.

Conventional onshore production in the lower 48 States, accounting for 44 percent of total U.S. crude oil production in 1999, is projected to decrease to 38 percent in 2020, with production from mature areas expected to decline. Offshore production is projected to range from 1.6 to 2.1 million barrels per day throughout the forecast, surpassing the projected level of lower 48 conventional onshore production from 2006 to 2016. Crude oil production from Alaska is expected to decline at an average annual rate of 2.4 percent between 1999 and 2020. Projected drops in production from most of Alaska's oil fields—particularly Prudhoe Bay, the State's largest producing field—are expected to be offset by production from the National Petroleum Reserve–Alaska (NPRA), which is projected to commence in 2010. Production from the Alaska National Wildlife Refuge (ANWR) is not included, because drilling in the area is currently prohibited. Production from enhanced oil recovery (EOR) [*90*] is expected to slow as it becomes less profitable when oil prices fall in the forecast through 2003, and then to increase along with the world oil price projections until close to the end of the forecast.

Imports Fill the Gap Between Domestic Supply and Demand

Figure 106. Petroleum supply, consumption, and imports, 1970-2020 (million barrels per day)



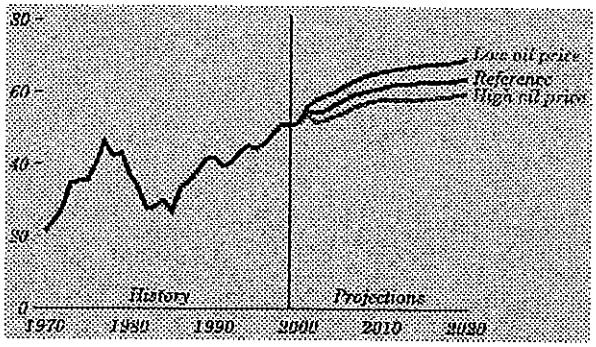
In the reference case, domestic petroleum supply is projected to decline slightly from its 1999 level of 9.5 million barrels per day to 9.3 million barrels per day in 2020 (Figure 106). As U.S. crude oil production falls off, refinery gain and production of natural gas plant liquids are projected to increase. Domestic supply in 2020 is projected to drop to 8.2 million barrels per day in the low oil price case and to rise to 10.1 million barrels per day in the high oil price case.

The greatest variation in petroleum consumption levels is seen across the economic growth cases, with a projected increase of 8.5 million barrels per day over the 1999 level in the high growth case, compared with a projected increase of only 4.4 million barrels per day in the low growth case.

Additional petroleum imports would be needed to fill the projected widening gap between supply and consumption. The greatest gap between supply and consumption is projected in the low world oil price case and the smallest in the low economic growth case. The projections for net petroleum imports in 2020 range from a high of 18.8 million barrels per day in the low oil price case to a low of 15.0 million barrels per day in the low growth case, compared with the 1999 level of 10.0 million barrels per day. The expected value of petroleum imports in 2020 ranges from $115.8 billion in the low price case to $170.8 billion in the high economic growth case. Total annual U.S. expenditures for petroleum imports, which reached a historical peak of $138.9 billion (in 1999 dollars) in 1980 [*91*], were $60.2 billion in 1999.

Growing Dependence on Petroleum Imports Is Projected

Figure 107. Share of U.S. petroleum consumption supplied by net imports in three oil price cases, 1970-2020 (percent)



In 1999, net imports of petroleum accounted for 51 percent of domestic petroleum consumption. Continued dependence on petroleum imports is projected, reaching 64 percent in 2020 in the reference case (Figure 107). The corresponding import shares of total consumption in 2020 are projected to be 60 percent in the high oil price case and 70 percent in the low price case.

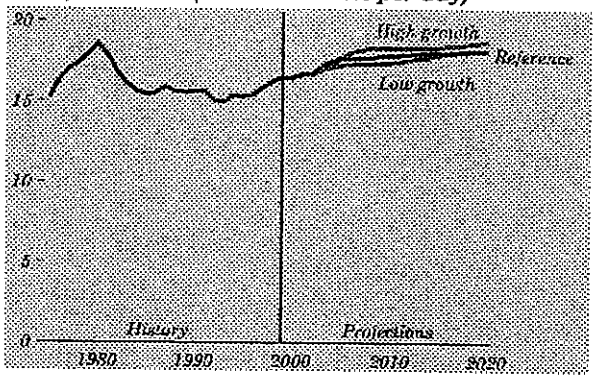
Although crude oil is expected to continue as the major component of petroleum imports, refined products are projected to represent a growing share. More imports would be needed as the projected growth in demand for refined products exceeds the expansion of domestic refining capacity. Refined products are projected to make up 19 percent of net petroleum imports in 2020 in the low economic growth case and 32 percent in the high growth case, as compared with their 13-percent share in 1999 (Table 18).

Table 18. Petroleum consumption and net imports in five cases, 1999 and 2020 (million barrels per day)

Year and projection	Product supplied	Net imports	Net crude imports	Net product imports
1999	19.5	9.9	8.6	1.3
2020				
Reference	25.3	16.5	12.1	4.4
Low oil price	27.0	18.8	13.3	5.5
High oil price	25.3	15.2	11.5	3.7
Low growth	23.9	15.0	12.1	2.9
High growth	28.0	18.2	12.5	5.8

New U.S. Oil Refining Capacity Is Likely To Be at Existing Refineries

Figure 108. Domestic refining capacity in three cases, 1975-2020 (million barrels per day)



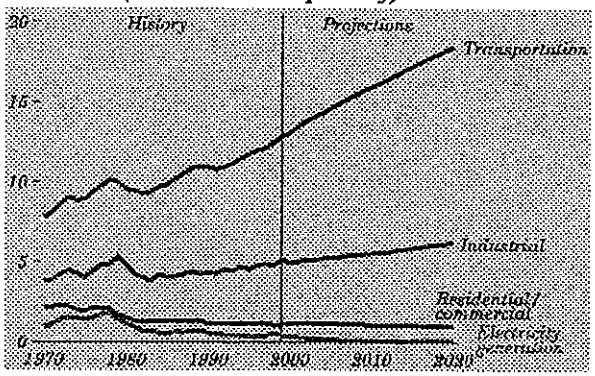
Falling demand for petroleum and the deregulation of the domestic refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity. That trend was reversed in 1995, and 1.2 million barrels per day of distillation capacity had been added by 2000. Financial and legal considerations make it unlikely that new refineries will be built in the United States, but additions at existing refineries are expected to increase total U.S. refining capacity in all the *AEO2001* cases (Figure 108).

Distillation capacity is projected to grow from the 1999 year-end level of 16.5 million barrels per day to 18.2 million in 2020 in the low economic growth case and 18.8 million in the high growth case, compared with the 1981 peak of 18.6 million barrels per day. Almost all the capacity additions are projected to occur on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively throughout the forecast, in a range from 91 percent to 95 percent of design capacity. In comparison, the 1999 utilization rate was 93 percent, well above the rates of the 1980s and early 1990s.

Additional "downstream" processing units are expected to allow domestic refineries to produce less residual fuel, which has a shrinking market, and more higher value "light product" such as gasoline, distillate, jet fuel, and liquefied petroleum gases.

Petroleum Use Increases Mainly in the Transportation Sector

Figure 109. Petroleum consumption by sector, 1970-2020 (million barrels per day)



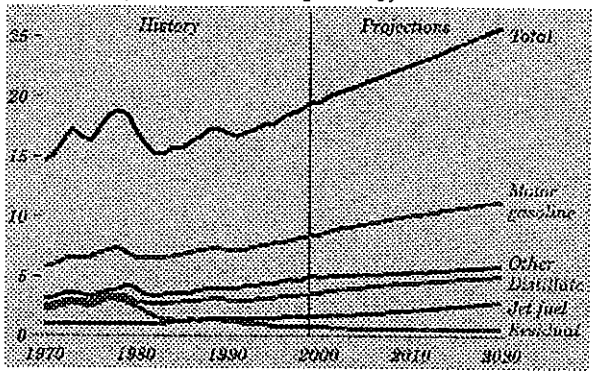
U.S. petroleum consumption is projected to increase by 6.3 million barrels per day between 1999 and 2020. Most of the increase is expected in the transportation sector, which accounted for two-thirds of U.S. petroleum use in 1999 (Figure 109). Petroleum use for transportation is projected to increase by 5.6 million barrels per day in the reference case, 4.3 million in the low economic growth case, and 7.0 million in the high economic growth case.

In the industrial sector, which currently accounts for 26 percent of U.S. petroleum use, consumption in 2020 is projected to be higher than the 1999 level by 1.1 million barrels per day in the reference case, by 0.4 million in the low economic growth case, and by 1.9 million in the high economic growth case. About 84 percent of the growth is expected in the petrochemical, construction, and refining sectors.

In the reference case, petroleum use for heating and for electricity generation is expected to decline as oil loses market share to natural gas. Increased oil use for heating and electricity generation is projected, however, in the low oil price case. Natural gas use for home heating is growing in New England, the last stronghold of heating oil. Compared with 1999, heating oil use is projected to be 150,000 barrels per day lower in 2020 in the high price case and 90,000 barrels per day higher in the low price case. For electricity generation, oil-fired steam plants are being retired in favor of natural gas combined-cycle units. Oil use for electricity generation (excluding cogeneration) is projected to be 320,000 barrels per day lower in 2020 than in 1999 in the high price case and 110,000 barrels per day higher in the low price case.

Light Products Account for Most of the Increase in Demand for Petroleum

Figure 110. Consumption of petroleum products, 1970-2020 (million barrels per day)

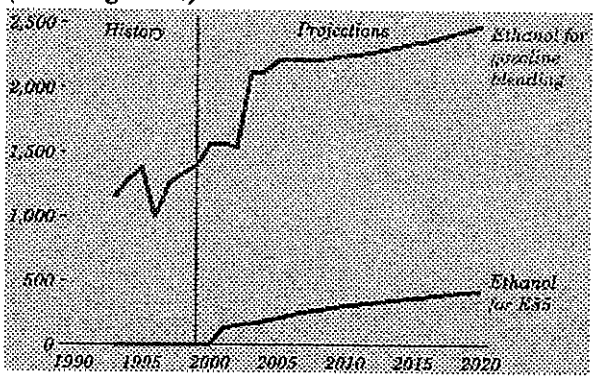


About 96 percent of the projected growth in petroleum consumption stems from increased consumption of "light products," including gasoline, diesel, heating oil, jet fuel, and liquefied petroleum gases, which are more difficult and costly to produce than heavy products (Figure 110). Although refinery investments and enhancements are expected to increase the ability of domestic refineries to produce light products, imports of light products are expected to more than triple by 2020.

In the forecast, gasoline continues to account for almost 45 percent of all the petroleum used in the United States. Between 1999 and 2020, U.S. gasoline consumption is projected to rise from 8.4 million barrels per day to 11.3 million barrels per day. Consumption of distillate fuel is projected to be 1.6 million barrels per day higher in 2020 than it was in 1999, with diesel fuel accounting for 92 percent of the projected increase as demand for freight transportation grows. With air travel also expected to increase, jet fuel consumption is projected to be 1.2 million barrels per day higher in 2020 than in 1999. Consumption of liquefied petroleum gas (LPG), included in "other" petroleum, is projected to increase by about 360,000 barrels per day between 1999 and 2020. Consumption of "other" petroleum products—including petrochemical feedstocks, still gas used to fuel refineries, asphalt and road oil, and other miscellaneous products—is projected to grow by 490,000 barrels per day. Residual fuel use, mainly for electricity generation, is projected to decline from 820,000 barrels per day in 1999 to 600,000 barrels per day in 2020.

State Bans on MTBE Are Expected To Result in Increased Use of Ethanol

Figure 111. U.S. ethanol consumption, 1993-2020 (million gallons)



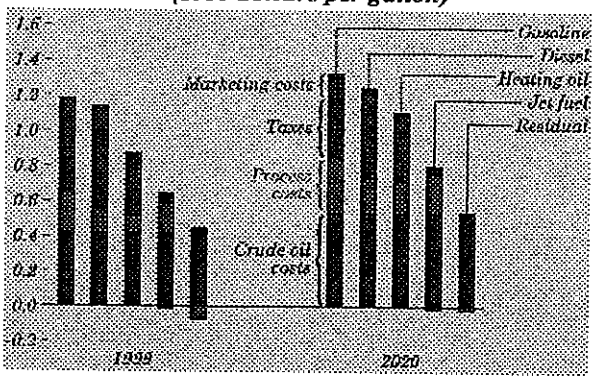
U.S. ethanol production, with corn as the primary feedstock, reached 1.5 billion gallons in 1999. Production is projected to increase to 2.9 billion gallons by 2020, with most of the growth coming from the conversion of cellulosic biomass to ethanol. Ethanol is used primarily in the Midwest as a gasoline volume extender and octane enhancer in a blend of 10 percent ethanol and 90 percent gasoline. It also serves as an oxygenate in areas that are required to use oxygenated fuels (with a minimum 2.7 percent oxygen content by volume) during the winter months to reduce carbon monoxide emissions.

AEO2001 projects an expanded role for ethanol, replacing MTBE as the oxygenate for reformulated gasoline (RFG) in the eight States that have passed legislation limiting the use of MTBE because of concerns about groundwater contamination. The reference case assumes that the Federal requirement for a 2-percent oxygen content in RFG will continue in all States. Ethanol consumption in E85 vehicles is also projected to increase, from the national total of 2.0 million gallons in 1999 to 421 million gallons in 2020 (Figure 111). E85 vehicles are currently in use as government fleet vehicles, flexible-fuel passenger vehicles (which run on either E85 or gasoline), and urban transit buses.

The Federal Highway Bill of 1998 extended the current excise tax exemption for ethanol through 2007 but stipulated reductions from 54 cents per gallon to 53 cents in 2001, 52 cents in 2003, and 51 cents in 2005. *AEO2001* assumes that the exemption will be extended at 51 cents per gallon (nominal) through 2020.

Processing Costs for Most Petroleum Products Rise in the Forecast

Figure 112. Components of refined product costs, 1999 and 2020 (1999 dollars per gallon)

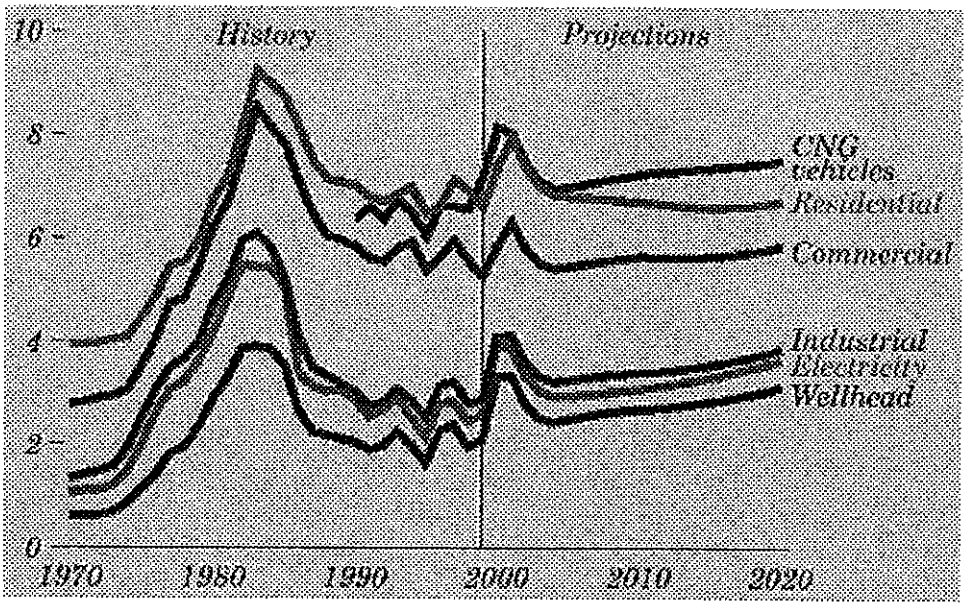


Refined product prices are determined by crude oil costs, refining process costs (including refiner profits), marketing costs, and taxes (Figure 112). In the *AEO2001* projections, crude oil costs are projected to continue making the greatest contribution to product prices and marketing costs are projected to remain stable, but the contributions of processing costs and taxes are expected to change considerably.

The processing costs for light products, including gasoline, diesel fuel, heating oil, and jet fuel, are projected to increase by 6 to 7 cents per gallon between 1999 and 2020. The expected increases are attributed primarily to the projected growth in demand for those products, investment needed to meet new Federal requirements for low-sulfur gasoline between 2004 and 2007, and investments related to compliance with refinery emissions, health, and safety regulations.

Whereas processing costs tend to increase refined product prices in the forecast, assumptions about Federal taxes tend to slow the growth of motor fuels prices. In keeping with the *AEO2001* assumption of current laws and legislation, Federal motor fuels taxes are assumed to remain at nominal 1999 levels throughout the forecast, although Federal taxes have actually been raised sporadically in the past. State motor fuels taxes are assumed to keep up with inflation, as they have in the past. The net impact of the assumptions is an expected decrease in Federal taxes (in 1999 dollars) between 1999 and 2020—7 cents per gallon for gasoline, 9 cents for diesel fuel, and 1 cent for jet fuel.

Figure 99. Natural gas end-use prices by sector, 1970-2020 (1999 dollars per thousand cubic feet)



History: Energy Information Administration, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). **Projections:** Table A14.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts				
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AGA	NPC
2015								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	2.83	2.59	3.20	2.64	1.89	2.79	2.56	3.67
Dry gas production[b]	26.24	24.63	27.86	24.43	28.58	24.00	26.71	26.50
Net imports	5.50	5.35	5.62	5.35	4.01	5.70	4.16	4.70
Consumption	31.61	29.85	33.36	30.18	32.78	29.46	30.86	31.84
Residential	5.83	6.70	5.90	5.67	5.67	5.57	5.93	6.07
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3.95	4.09
Industrial[e]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10.72	10.76
Electricity generators[f]	9.30	8.54	9.97	11.63[e]	8.72	9.25[g]	7.06	7.76
Other[h]	2.78	2.63	2.92	2.57	3.27	2.75	3.20	3.16[i]
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6.31[j]	7.65
Commercial[e]	5.65	5.41	6.00	6.16[d]	4.62	6.08	5.07[j]	6.76
Industrial[e]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.09[j,l]	4.86[k]
Electricity generators[f]	3.30	3.05	3.67	3.12[e]	2.55	3.24	2.99[j]	4.21
2020								
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	3.18	2.66	3.68	2.72	NA	3.07	NA	NA
Dry gas production[b]	29.04	26.74	30.38	25.72	NA	25.13	NA	NA
Net imports	5.80	5.58	5.82	5.73	NA	6.00	NA	NA
Consumption	34.78	32.22	36.09	31.82	NA	28.58	NA	NA
Residential	6.14	5.95	6.21	5.88	NA	5.84	NA	NA
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.45[d]	NA	NA
Industrial[e]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	NA	NA
Electricity generators[f]	11.34	10.23	11.39	12.72[e]	NA	9.89[g]	NA	NA
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	NA	NA
End-use prices (1999 dollars per thousand cubic feet)								
Residential	6.73	6.32	7.24	7.44	NA	7.25	NA	NA
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	NA	NA
Industrial[e]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	NA	NA
Electricity generators[f]	3.66	3.17	4.17	3.20[e]	NA	3.52	NA	NA

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore, forecast values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.

Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,029 Btu per cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.

Sources: *AEO2001*: AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case), LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). WEFA: The WEFA Group, *Natural Gas Outlook* (2000). GRI: Gas Research Institute, *GRI Baseline Projection of U.S. Energy Supply and Demand*, 2000 Edition (January 2000). DRI: Standard & Poor's DRI, *U.S. Energy Outlook* (Spring/Summer 2000). AGA: American Gas Association, *1999 AGA-TERA Base Case* (December 1999). NPC: National Petroleum Council, *Natural Gas, Meeting the Challenges of the Nation's Growing Natural Gas Demand* (December 1999).

Table A3. Energy Prices by Sector and Source
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Residential	13.54	13.17	12.93	13.16	13.33	13.59	0.1%
Primary Energy[1]	6.87	6.72	7.12	7.01	6.92	7.01	0.2%
Petroleum Products[2]	7.53	7.56	9.18	9.37	9.49	9.64	1.2%
Distillate Fuel	6.25	6.27	7.33	7.51	7.80	7.98	1.2%
Liquefied Petroleum Gas	10.45	10.36	12.83	13.07	12.83	12.87	1.0%
Natural Gas	6.74	6.52	6.63	6.63	6.44	6.55	0.0%
Electricity	24.24	23.60	21.90	21.88	22.01	22.17	-0.3%
Commercial	13.53	13.25	12.39	11.75	11.98	12.37	-0.3%
Primary Energy[1]	5.26	5.22	5.35	5.53	5.55	5.74	0.5%
Petroleum Products[2]	4.66	5.00	6.01	6.17	6.34	6.50	1.3%
Distillate Fuel	4.01	4.37	5.12	5.28	5.55	5.75	1.3%
Residual Fuel	2.42	2.63	3.64	3.69	3.77	3.85	1.8%
Natural Gas[3]	5.47	5.34	5.31	5.50	5.50	5.71	0.3%
Electricity	22.17	21.54	19.58	17.63	17.72	18.12	-0.8%
Industrial[4]	4.97	5.33	5.48	5.45	5.56	5.85	0.4%
Primary Energy	3.51	3.92	4.25	4.38	4.48	4.72	0.9%
Petroleum Products[2]	4.79	5.55	5.95	6.05	6.10	6.27	0.6%
Distillate Fuel	4.11	4.65	5.29	5.46	5.73	5.94	1.2%
Liquefied Petroleum Gas	7.27	8.50	7.94	8.01	7.75	7.83	-0.4%
Residual Fuel	2.56	2.78	3.36	3.42	3.50	3.58	1.2%
Natural Gas[5]	2.73	2.79	3.17	3.31	3.45	3.76	1.4%
Metallurgical Coal	1.73	1.65	1.59	1.54	1.49	1.44	-0.7%
Steam Coal	1.45	1.43	1.35	1.29	1.25	1.21	-0.8%
Electricity	13.34	13.09	12.34	11.24	11.27	11.62	-0.6%
Transportation	7.70	8.30	9.27	9.46	9.38	9.31	0.5%
Primary Energy	7.68	8.29	9.25	9.45	9.36	9.29	0.5%
Petroleum Products[2]	7.68	8.28	9.25	9.44	9.36	9.29	0.5%
Distillate Fuel[6]	7.66	8.22	8.89	8.94	9.05	8.98	0.4%
Jet Fuel[7]	4.13	4.70	5.25	5.47	5.75	5.88	1.1%
Motor Gasoline[8]	8.74	9.45	10.64	10.93	10.75	10.68	0.8%
Residual Fuel	2.29	2.46	3.10	3.18	3.25	3.33	1.5%
Liquefied Petroleum Gas[9]	11.23	12.87	14.19	14.28	13.96	13.84	0.3%
Natural Gas[10]	6.40	7.02	6.80	7.04	7.17	7.32	0.2%
Ethanol (E85)[11]	14.25	14.42	19.12	19.00	19.24	19.36	1.4%
Methanol (M85)[12]	8.93	10.38	13.12	13.74	14.33	14.43	1.6%
Electricity	15.86	15.57	14.33	13.47	13.21	13.06	-0.8%
Average End-Use Energy	8.28	8.55	8.91	8.95	9.01	9.17	0.3%
Primary Energy	5.89	6.33	7.00	7.18	7.21	7.30	0.7%
Electricity	20.03	19.50	18.15	17.20	17.30	17.59	-0.5%
Electric Generators[13]							
Fossil Fuel Average	1.50	1.49	1.52	1.54	1.68	1.86	1.1%
Petroleum Products	2.32	2.50	3.70	4.11	4.27	4.35	2.7%
Distillate Fuel	3.25	4.05	4.65	4.84	5.10	5.28	1.3%
Residual Fuel	2.22	2.42	3.52	3.88	4.00	4.07	2.5%
Natural Gas	2.41	2.55	2.88	3.03	3.24	3.59	1.6%
Steam Coal	1.27	1.21	1.13	1.05	1.01	0.96	-1.0%

Table A8. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Generation by Fuel Type							
Electric Generators[1]							
Coal	1826	1833	2065	2196	2246	2298	1.1%
Petroleum	115	100	32	17	17	19	-7.7%
Natural Gas[2]	346	371	584	900	1266	1587	7.2%
Nuclear Power	674	730	740	720	639	574	-1.1%
Pumped Storage	-2	-1	-1	-1	-1	-1	N/A
Renewable Sources[3]	359	353	370	390	395	396	0.5%
Total	3317	3386	3810	4222	4563	4872	1.7%
Nonutility Generation for Own Use	16	16	17	16	16	16	-0.0%
Distributed Generation	0	0	1	3	4	6	N/A
Cogenerators[4]							
Coal	52	47	52	52	52	52	0.5%
Petroleum	15	9	10	10	10	10	0.4%
Natural Gas	197	206	239	257	276	299	1.8%
Other Gaseous Fuels[5]	8	4	6	7	7	8	3.3%
Renewable Sources[3]	31	31	34	39	44	48	2.0%
Other[6]	8	5	5	5	5	5	0.3%
Total	310	302	347	370	394	422	1.8%
Other End-Use Generators[7]	6	5	5	5	5	5	0.6%
Sales to Utilities	158	151	171	176	187	200	1.4%
Generation for Own Use	158	156	181	199	213	227	1.8%
Net Imports[8]	27	32	52	29	21	21	-2.0%
Electricity Sales by Sector							
Residential	1128	1146	1316	1455	1573	1701	1.9%
Commercial	1068	1083	1274	1432	1559	1643	2.0%
Industrial	1040	1063	1144	1226	1309	1411	1.4%
Transportation	17	17	28	35	43	49	5.0%
Total	3253	3309	3761	4147	4484	4804	1.8%
End-Use Prices (1999 cents per kilowatthour)[9]							
Residential	8.3	8.1	7.5	7.5	7.5	7.6	-0.3%
Commercial	7.6	7.3	6.7	6.0	6.0	6.2	-0.8%
Industrial	4.6	4.5	4.2	3.8	3.8	4.0	-0.6%
Transportation	5.4	5.3	4.9	4.6	4.5	4.5	-0.8%
All Sectors Average	6.8	6.7	6.2	5.9	5.9	6.0	-0.5%
Prices by Service Category (1999 cents per kilowatthour)[9]							
Generation	4.3	4.1	3.6	3.2	3.2	3.4	-0.9%
Transmission	0.6	0.6	0.6	0.7	0.7	0.7	0.7%
Distribution	2.0	2.0	2.0	2.0	2.0	2.0	-0.0%
Emissions (million short tons)							
Sulfur Dioxide	13.13	12.46	10.30	9.28	9.33	8.95	-1.6%
Nitrogen Oxide	5.83	5.45	4.25	4.22	4.33	4.42	-1.0%

[1]Includes grid-connected generation at all utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.
[2]Includes electricity generation by fuel cells.
[3]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[4]Cogenerators produce electricity and other useful thermal energy. Includes sales to utilities and generation for own use.
[5]Other gaseous fuels include refinery and still gas.
[6]Other includes hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.
[7]Includes small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.
[8]In 1999 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.
[9]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1998: Electric generators and cogenerators generation, sales to utilities, net imports, residential, industrial, and total electricity sales, and emissions: Energy Information Administration (EIA), *Electric Power Annual 1998, Volume 2*, DOE/EIA-0348(98)/2 (Washington, DC, December 1999), and supporting databases. Other generators: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility" and Department of Energy, Office of Energy Efficiency and Renewable Energy estimates. Commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 19* (Oak Ridge, TN, 1999 September 1999). Prices: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A. 1999 and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A.

Reference Case Forecast

Table A14. Natural Gas Prices, Margins, and Revenues
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	Reference Case						Annual Growth 1999-2020 (percent)
	1998	1999	2005	2010	2015	2020	
Source Price							
Average Lower 48 Wellhead Price[1]	2.02	2.08	2.49	2.69	2.83	3.13	2.0%
Average Import Price	1.99	2.29	2.49	2.43	2.47	2.67	0.7%
Average[2]	2.01	2.11	2.49	2.64	2.76	3.05	1.8%
Delivered Prices							
Residential	6.92	6.69	6.81	6.70	6.61	6.73	0.0%
Commercial	5.62	5.49	5.45	5.55	5.65	5.86	0.3%
Industrial[3]	2.80	2.87	3.26	3.40	3.54	3.88	1.4%
Electric Generators[4]	2.48	2.59	2.94	3.08	3.30	3.66	1.6%
Transportation[5]	6.57	7.21	6.99	7.23	7.36	7.52	0.2%
Average[6]	4.13	4.16	4.35	4.38	4.39	4.62	0.5%
Transmission and Distribution Margins[7]							
Residential	4.91	4.58	4.32	4.07	3.85	3.68	-1.0%
Commercial	3.60	3.37	2.96	3.01	2.89	2.81	-0.9%
Industrial[3]	0.79	0.75	0.77	0.76	0.78	0.82	0.4%
Electric Generators[4]	0.44	0.48	0.44	0.45	0.54	0.61	1.2%
Transportation[5]	4.56	5.10	4.50	4.60	4.80	4.48	-0.6%
Average[6]	2.12	2.04	1.86	1.74	1.63	1.57	-1.2%
Transmission and Distribution Revenue (billion 1999 dollars)							
Residential	22.31	21.61	22.96	22.55	22.42	22.58	0.2%
Commercial	10.87	10.36	10.71	11.40	11.38	11.31	0.4%
Industrial[3]	6.60	6.00	5.75	7.12	7.61	8.32	1.6%
Electric Generators[4]	1.53	1.81	2.38	3.11	5.02	6.93	6.6%
Transportation[5]	0.05	0.06	0.25	0.42	0.58	0.69	11.0%
Total	41.45	39.86	43.04	44.59	47.81	49.82	1.1%

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.
Note: Totals may not equal sum of components due to independent rounding. Data for 1998 and 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1998 residential, commercial, and transportation delivered prices; average lower 48 wellhead price; and average import price: Energy Information Administration (EIA), *Natural Gas Annual 1998*, DOE/EIA-0131(98) (Washington, DC, October 1999). 1998 electric generators delivered price: Form FERC-423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 1998 and 1999 industrial delivered prices based on EIA, *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1998 values, other 1999 values, and projections: EIA, AEO2001 National Energy Modeling System run AEO2001.D101600A.

Table B14. Natural Gas Prices, Margins, and Revenue
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	1999	Projections								
		2010			2015			2020		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Source Price										
Average Lower 48 Wellhead Price[1]	2.08	2.49	2.69	3.06	2.59	2.83	3.20	2.66	3.13	3.68
Average Import Price	2.29	2.33	2.43	2.53	2.35	2.47	2.58	2.44	2.67	2.89
Average[2]	2.11	2.46	2.64	2.98	2.54	2.78	3.09	2.62	3.05	3.55
Delivered Prices										
Residential	6.69	6.50	6.70	7.09	6.37	6.61	6.95	6.32	6.73	7.24
Commercial	5.49	5.46	5.65	6.03	5.41	5.65	6.00	5.42	5.86	6.38
Industrial[3]	2.87	3.20	3.40	3.78	3.29	3.54	3.91	3.38	3.86	4.43
Electric Generators[4]	2.59	2.90	3.08	3.45	3.05	3.30	3.67	3.17	3.66	4.17
Transportation[5]	7.21	6.95	7.23	7.74	6.99	7.36	7.84	6.96	7.52	8.17
Average[6]	4.16	4.21	4.38	4.72	4.17	4.39	4.72	4.19	4.62	5.14
Transmission & Distribution Margins[7]										
Residential	4.58	4.05	4.07	4.12	3.83	3.85	3.86	3.70	3.68	3.69
Commercial	3.37	2.99	3.01	3.05	2.86	2.89	2.91	2.80	2.81	2.84
Industrial[3]	0.75	0.74	0.76	0.80	0.74	0.78	0.82	0.78	0.82	0.88
Electric Generators[4]	0.48	0.44	0.45	0.47	0.50	0.54	0.59	0.55	0.61	0.62
Transportation[5]	5.10	4.49	4.60	4.76	4.45	4.60	4.75	4.34	4.48	4.62
Average[6]	2.04	1.75	1.74	1.74	1.63	1.63	1.63	1.57	1.57	1.60
Transmission & Distribution Revenue (billion 1999 dollars)										
Residential	21.61	22.21	22.55	22.88	21.83	22.42	22.78	22.03	22.58	22.93
Commercial	10.36	11.05	11.40	11.72	10.85	11.38	11.84	10.73	11.31	11.88
Industrial[3]	6.00	6.66	7.12	7.88	6.80	7.61	8.66	7.08	8.32	9.86
Electric Generators[4]	1.81	2.87	3.11	3.48	4.29	5.02	5.84	5.67	6.93	7.05
Transportation[5]	0.06	0.39	0.42	0.45	0.53	0.58	0.63	0.62	0.69	0.77
Total	39.86	43.18	44.59	46.40	44.31	47.01	49.76	46.13	49.82	52.48

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption by cogenerators.
[4]Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.
Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.
Sources: 1999 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1999 values and projections: EIA, AEO2001 National Energy Modeling System runs LM2001.D101600A, AEO2001.D101600A, and HM2001.D101600A.

Report Contents

[Report# DOE/EIA-0383(2001)]
December 22, 2000
(Next Release: December, 2001)

Preface

Overview

Legislation & Regulations

Issues in Focus

Market Trends

Forecast Comparisons

Major Assumptions for the Forecasts

Summary of the AEO2001 Cases/ Scenarios
- Appendix Table G1

Model Results (Formats - PDF, ZIP)
- Appendix Tables
- Reference Case
- 1999 to 2020

Download

Forecast Comparisons

Economic Growth	World Oil Prices	Total Energy Consumption	Residential and Commercial Sectors	Industrial Sector
Transportation Sector	Electricity	Natural Gas	Petroleum	Coal

Three other organizations—Standard & Poor's DRI (DRI), the WEFA Group (WEFA), and the Gas Research Institute (GRI) [95]—also produce comprehensive energy projections with a time horizon similar to that of *AEO2001*. The most recent projections from those organizations (DRI, Spring/Summer 2000; WEFA, 1st Quarter 2000; GRI, January 2000), as well as other forecasts that concentrate on petroleum, natural gas, and international oil markets, are compared here with the *AEO2001* projections.

Economic Growth

Differences in long-run economic forecasts can be traced primarily to different views of the major supply-side determinants of growth in gross domestic product (GDP): labor force and productivity change (Table 19). In comparison with the *AEO2001* and DRI reference cases, the WEFA forecast shows the highest economic growth, including a higher growth rate for the labor force. The *AEO2001* long-run forecast of average annual economic growth from 1999 to 2020 in the reference case is 3.0 percent—0.9 percent higher than the *AEO2000* forecast.

Table 19. Forecasts of economic growth, 1999-2020

The June 26, 2000, mid-session review by the Office of Management and Budget projected real GDP growth of 3.1 percent per year between 1999 and 2010. *AEO2001* projects annual growth of 3.3 percent over the same period.

World Oil Prices

Comparisons with other oil price forecasts—including the International Energy Agency (IEA), Petroleum Economics Ltd. (PEL), Petroleum Industry Research Associates, Inc. (PIRA), Natural Resources Canada (NRCan), and Deutsche Banc Alex. Brown (DBAB)—are shown in Table 20 (IEA, 1998; PEL, February 2000; PIRA, October 2000; NRCan, April 1997; DBAB, June 2000). With the exception of IEA and PEL, the range between the *AEO2001* low and high world oil price cases spans the range of other published forecasts.

Table 20. Forecasts of world oil prices, 2000-2020

Total Energy Consumption

Report
- Entire AEO2001 (PDF)
- AEO2001 by Chapters (PDF)

Acronyms

Contacts

Feedback

Related Links

Assumptions to the AEO2001

Supplemental Data to the AEO2001 (Only available on the Web)
- Regional and more detailed AEO 2001 Reference Case Results
- 1998, 2000 to 2020

NEMS Conference

Forecast Homepage

EIA Homepage

The *AEO2001* forecast of end-use sector energy consumption over the next two decades shows far less volatility than has occurred historically. Between 1974 and 1984, volatile world oil markets dampened domestic oil consumption. Consumers switched to electricity-based technologies in the buildings sector, while in the transportation sector new car fuel efficiency nearly doubled. Natural gas use declined as a result of high prices and limitations on new gas hookups. Between 1984 and 1995, however, both petroleum and natural gas consumption rebounded, bolstered by plentiful supplies and declining real energy prices. As a consequence, new car fuel efficiency in 1995 was less than 2 miles per gallon higher than in 1984, and natural gas use (residential, commercial, and industrial) was almost 25 percent higher than it was in 1984.

Given potentially different assumptions about, for example, technological developments over the next 20 years, the forecasts from DRI, GRI, and WEFA have remarkable similarities with the *AEO2001* projections. Electricity is expected to remain the fastest growing source of delivered energy (Table 21), although its projected rate of growth is down sharply from historical rates in each of the forecasts, because many traditional uses of electricity (such as for air conditioning) approach saturation while average equipment efficiencies rise. Petroleum use and natural gas consumption are projected to grow at rates similar to those of recent years. For other fuels, future growth in consumption is expected to slow as a result of moderating economic growth, fuel switching, and increased end-use efficiency.

Table 21. Forecasts of average annual growth rates for energy consumption (percent)

Residential and Commercial Sectors

Growth rates for energy demand in the residential and commercial sectors are expected to decrease by more than 25 percent from the rates between 1984 and 1998, largely because of projected lower growth in population, housing starts, and commercial floorspace additions. Other contributing factors include increasing energy efficiency due to technical innovations and legislated standards; voluntary government efficiency programs; and reduced opportunities for additional market penetration of such end uses as air conditioning.

Differing views on the growth of new uses for energy contribute to variations among the forecasts. By fuel, electricity (excluding generation and transmission losses) remains the fastest growing energy source for both sectors across all forecasts (Table 22). All the forecasts project substantial growth in electricity use, with the *AEO2001*, DRI, and WEFA projections showing slower growth toward the end of the forecast. Natural gas use also is projected to grow but at lower rates, and projected petroleum use either is stable or continues to fall. GRI projects a more rapid decline in oil use, particularly for commercial space and water heating, than the other forecasts.

Table 22. Forecasts of average annual growth in residential and commercial energy demand (percent)

Industrial Sector

The projected growth rates for delivered energy consumption in the industrial sector range from 1.0 percent to 1.4 percent per year (Table 23). The *AEO2001* forecast is in the middle, at 1.2 percent. Generally, the projected growth rates are somewhat lower than the actual rates from 1984 to 1998. The decline is attributable to lower growth for GDP and manufacturing output. In addition, there has been a continuing shift in the industrial output mix toward less energy-intensive products.

The growth rates for different fuels in the industrial sector between 1984 and 1998 reflect a shift from petroleum products and coal to greater reliance on natural gas and electricity. In all the forecasts, natural gas use is expected to grow more slowly than in recent history, because much of the potential for fuel switching was realized during the 1980s. A key uncertainty in industrial coal forecasts is the environmental acceptability of coal as a boiler fuel.

Table 23. Forecasts of average annual growth in industrial energy demand (percent)

Transportation Sector

Overall fuel consumption in the transportation sector is expected to grow slightly more slowly than in the recent past in each of the forecasts (Table 24). All the forecasts anticipate continued rapid growth in air travel and considerably slower growth in light-duty vehicle travel. Demand for diesel fuel is expected to grow more slowly in all the forecasts than it has in the past.

GRI and WEFA project slower growth in gasoline demand as a result of slower growth in light-duty vehicle travel, and GRI projects more rapid efficiency improvements. GRI also projects the slowest growth in air travel of all the forecasts, leading to slower growth in jet fuel demand. For diesel fuel, however, GRI projects rapid growth in demand comparable to the *AEO2001* forecast, because it projects similar annual growth in freight travel.

Table 24. Forecasts of average annual growth in transportation energy demand (percent)

Electricity

Comparison across forecasts shows slight variation in projected electricity sales (Table 25). Sales projections for 2020 range from 1,485 billion kilowatthours (DRI) to 1,610 billion kilowatthours (WEFA) for the residential sector, as compared with the *AEO2001* reference case value of 1,701 billion kilowatthours. The forecasts for total electricity sales in 2020 range from 4,450 billion kilowatthours (DRI) to 4,503 billion kilowatthours (WEFA), compared with the *AEO2001* reference case value of 4,804 billion kilowatthours. All the projections for total electricity sales in 2020 fall below the range of the *AEO2001* low and high economic growth cases (4,516 and 5,135 billion kilowatthours, respectively). Different assumptions related to expected economic activity, coupled with diversity in the estimation of penetration rates for energy-efficient technologies, are the primary reasons for variation among the forecasts. All the forecasts compared here agree that stable fuel prices and slow growth in electricity demand relative to GDP growth will tend to keep the price of electricity stable—or declining in real terms—until 2020.

Table 25. Comparison of electricity forecasts (billion kilowatthours, except where noted)

Both the DRI and GRI forecasts assume that the electric power industry will be fully restructured, resulting in average electricity prices that approach long-run marginal costs. *AEO2001* also assumes that competitive pressures will grow and continue to push prices down until the later years of the projections. *AEO2001* also assumes that increased competition in the electric power industry will lead to lower operating and maintenance costs, lower general and administrative costs, early retirement of inefficient generating units, and other cost reductions. Further, in the DRI forecast, it is assumed that time-of-use electricity rates will cause some

flattening of electricity demand (lower peak period sales relative to average sales), resulting in better utilization of capacity and capital cost savings.

The distribution of sales among sectors affects the mix of capacity types needed to satisfy sectoral demand. Although the *AEO2001* mix of capacity among fuels is similar to those in the other forecasts, small differences in sectoral demands across the forecasts could lead to significant differences in the expected mix of capacity types. In general, recent growth in the residential sector, coupled with an oversupply of baseload capacity, results in a need for more peaking and intermediate capacity than baseload capacity. Consequently, generators are expected to plan for more combustion turbine and combined-cycle technology than coal, oil, or gas steam capacity.

Natural Gas

The differences among published forecasts of natural gas prices, production, consumption, and imports (Table 26) indicate the uncertainty of future market trends. Because the forecasts depend heavily on the underlying assumptions that shape them, the assumptions should be considered when different projections are compared. For instance, the forecast from GRI incorporates a cyclical price trend based on exploration and production cycles, which can be deceptive when isolated years are considered. In both 2015 and 2020, the forecast with the highest natural gas consumption is the *AEO2001* high economic growth forecast (33.36 and 36.09 trillion cubic feet, respectively); and the forecast with the lowest level is the DRI forecast (29.46 and 28.58 trillion cubic feet, respectively).

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

The National Petroleum Council (NPC) forecast shows the greatest expected growth in natural gas consumption between 1999 and 2015 in the residential and commercial sectors. The DRI forecast shows the lowest growth between 1999 and 2015 and also between 1999 and 2020. For residential consumption in 2015, the expected percentage increase over 1999 is 10 percentage points higher in the NPC forecast than in the DRI forecast; for commercial consumption the difference is 23 percentage points. The DRI forecast for commercial consumption is significantly lower than the other forecasts, due in part to definitional differences, and is even lower for 2020 than for 2015. Both the *AEO2001* reference and high economic growth forecasts for residential and commercial consumption exceed the other forecasts for 2020.

For industrial sector consumption of natural gas, the WEFA and DRI forecasts are not strictly comparable with the others because of differences in definitions. Among the remaining forecasts, the *AEO2001* reference, low economic growth, and high economic growth cases all project lower consumption in 2015 than do the GRI, AGA, and NPC reference cases. All the forecasts project the strongest growth in natural gas consumption for the electricity generation sector.

Domestic natural gas consumption is met by domestic production and imports. DRI projects the highest level of net imports, as well as the highest share of imports relative to total supply, in both 2015 and 2020. GRI's projection for 2015 is 1.7 trillion cubic feet lower than DRI's, corresponding to projected import shares of total supply at 12 percent and 19 percent, respectively. The forecasts available for 2020 are much more closely aligned. In general the projections for domestic production levels among the forecasts correspond to their projections for domestic consumption. GRI projects the highest production level in 2015, as well as relatively low import levels.

Table 26. Comparison of natural gas forecasts (trillion cubic feet, except where noted)

Projection	AEO2001			Other forecasts			
	Reference	Low economic growth	High economic growth	WEFA	GRI[a]	DRI	AG
2015							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**2.83**	**2.59**	**3.20**	**2.64**	**1.89**	**2.79**	**2**
Dry gas production[b]	**26.24**	**24.63**	**27.86**	**24.43**	**28.58**	**24.00**	**26**
Net imports	**5.50**	**5.35**	**5.62**	**5.35**	**4.01**	**5.70**	**4**
Consumption	**31.61**	**29.85**	**33.36**	**30.13**	**32.78**	**29.46**	**30**
Residential	5.83	5.70	5.90	5.67	5.67	5.57	5
Commercial[c]	3.94	3.79	4.07	3.93[d]	4.14	3.46[d]	3
Industrial[c]	9.76	9.18	10.50	6.33[d]	10.98	8.43[e]	10
Electricity generators[f]	9.30	8.54	9.97	11.63[c]	8.72	9.25[g]	7
Other[h]	2.78	2.63	2.92	2.57	3.27	2.75	3
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.61	6.37	6.95	7.36	5.51	7.02	6
Commercial[c]	5.65	5.41	6.00	6.16[d]	4.62	6.03	5
Industrial[c]	3.54	3.29	3.91	3.70[d,k]	2.91[k]	3.98[k]	3.(
Electricity generators[f]	3.30	3.05	3.67	3.12[c]	2.55	3.24	2
2020							
Lower 48 wellhead price (1999 dollars per thousand cubic feet)	**3.13**	**2.66**	**3.68**	**2.72**	**NA**	**3.07**	
Dry gas production[b]	**29.04**	**26.74**	**30.38**	**25.72**	**NA**	**25.13**	
Net imports	**5.80**	**5.58**	**5.82**	**5.72**	**NA**	**6.00**	
Consumption	**34.73**	**32.22**	**36.09**	**31.82**	**NA**	**28.58**	
Residential	6.14	5.95	6.21	5.88	NA	5.84	
Commercial[c]	4.02	3.83	4.19	4.05[d]	NA	3.43[d]	
Industrial[c]	10.18	9.36	11.20	6.45[d]	NA	8.82[e]	
Electricity generators[f]	11.34	10.23	11.29	12.72[c]	NA	9.89[g]	
Other[h]	3.06	2.85	3.20	2.71	NA	2.88	
End-use prices (1999 dollars per thousand cubic feet)							
Residential	6.73	6.32	7.24	7.44	NA	7.25	
Commercial[c]	5.86	5.42	6.38	6.25[d]	NA	6.26	
Industrial[c]	3.86	3.38	4.43	3.78[d,k]	NA	4.25[k]	
Electricity generators[f]	3.66	3.17	4.17	3.20[c]	NA	3.52	

[a]The baseline projection includes a cyclical price trend based on exploration and production cycles; therefore values for an isolated year may be misleading.
[b]Does not include supplemental fuels.
[c]Includes gas consumed in cogeneration.
[d]Excludes gas used for cogenerators and other nonutility generation.
[e]Excludes cogenerators' energy attributed to generating electricity
[f]Includes independent power producers and excludes cogenerators.
[g]Includes portion of cogeneration attributed to electricity generation
[h]Includes lease, plant, and pipeline fuel and fuel consumed in natural gas vehicles.
[i]Includes balancing item.
[j]Does not include certain State and local taxes levied on customers.
[k]On system sales or system gas (i.e., does not include gas delivered for the account of others).
[l]Volume-weighted average of "system" gas and "transportation" gas.
NA = Not available.
Note: Assumed conversion factors: electricity generators, 1,022 Btu per cubic foot; other end-use sectors, 1,(cubic foot; net imports, 1,022 Btu per cubic foot; production and other consumption, 1,028 Btu per cubic foot.
Sources: **AEO2001:** AEO2001 National Energy Modeling System, runs AEO2001.D101600A (reference case LM2001.D101600A (low economic growth case), and HM2001.D101600A (high economic growth case). **WEFA:** Group, Natural Gas Outlook (2000). **GRI:** Gas Research Institute, GRI Baseline Projection of U.S. Energy Supp Demand, 2000 Edition (January 2000). **DRI:** Standard & Poor's DRI, U.S. Energy Outlook (Spring/Summer 200 American Gas Association, 1999 AGA-TERA Base Case (December 1999). **NPC:** National Petroleum Council, Meeting the Challenges of the Nation's Growing Natural Gas Demand (December 1999).

Back to Forecast Comparisons

Even with production levels closer to the mid-range, the NPC forecast projects the highest wellhead price in 2015. At the other extreme, GRI projects the lowest wellhead price and the highest production levels. By 2020 the wellhead price forecasts from WEFA and DRI fall within the range of the *AEO2001* low and high economic growth cases, but both the WEFA and DRI forecasts for domestic production are lower than that in the *AEO2001* low economic growth case. With one exception, all the forecasts for end-use prices follow the same ranking from highest to lowest as do the wellhead price forecasts for both 2015 and 2020.

For the residential and commercial sectors in 2015, WEFA projects the highest end-use margins relative to the wellhead. The lowest projections for residential (GRI) and commercial (AGA) margins are $1.10 and $1.02 per thousand cubic feet lower than WEFA's, respectively, a noticeable difference. The GRI forecast, projecting relatively low residential and commercial margins, projects the highest margin to electricity generators in 2015, at $0.23 above the lowest (AGA). AGA generally projects the lowest margins, but they do not include some State and local taxes. Because of definitional differences industrial prices are not as readily comparable, although on-system sale prices would generally be expected to be higher than an estimate of the average price to all industrial customers. With the exception of the *AEO2001* high economic growth case, margins to the industrial sector are expected to decline through 2015 in all the forecasts. The *AEO2001* and NPC forecasts project declines of less than 10 percent in the industrial margin from 1998 to 2015, whereas the projected decline in the GRI and AGA forecasts is over 20 percent.

Petroleum

Projected prices for crude oil in the *AEO2001* low and high oil price cases (Table 27) bound the 2010 and 2020 projections in five other petroleum forecasts: the *AEO2001* reference case, WEFA, GRI, DRI, and the Independent Petroleum Association of America (IPAA). Comparisons with GRI and IPAA forecasts, which do not extend to 2020, apply only to 2010. *AEO2001* shows the highest reference case price path of the five forecasts. The *AEO2001* reference case projection for the world oil price in 2010 is $2.89 per barrel above the WEFA projection, $3.20 above GRI, and $2.72 above DRI. In 2020, however, the *AEO2001* reference case projection is only $2.00 per barrel above the WEFA projection and $1.25 above the DRI projection.

Table 27. Comparison of petroleum forecasts (million barrels per day, except where noted)

Crude oil price forecasts are influenced by differing views of the projected composition of world oil production, such as the expansion of OPEC oil production and the timing of an expected recovery in East Europe/former Soviet Union oil production. Differences may also arise on the basis of different views of the strength of the U.S. economy and the timing and strength of economic recovery in southeast Asia.

All the forecasts except GRI project a significant decline in domestic oil production between 2000 and 2010, reflecting assumed declines in proved reserves. GRI projects a milder decline before 2005, followed by an upturn in production between 2005 and 2015. Both WEFA and DRI continue their downward production projections to 2020, at slower rates. *AEO2001* projects a sharper decline before 2010 than do the other four projections, resulting in a 2010 reference case projection for crude oil production that is at least 280,000 barrels per day below the other reference case forecasts.

The *AEO2001* reference case projects relatively little change in annual domestic oil production between 2010 and 2020, whereas the high world oil price case projects a slight recovery after 2010, leading to more production in 2020 than in 2010. As a result, projected production in 2020 in the *AEO2001* high oil price case is above the WEFA and DRI projections, whereas the *AEO2001* reference case projection is essentially the same as the WEFA projection. The *AEO2001* projections for production of natural gas liquids are within the range of the other forecasts. GRI projects the highest level of natural gas liquids production in 2010 at 2.69 million barrels per day and IPAA the lowest at 2.03 million barrels per day.

The three *AEO2001* cases, along with DRI and IPAA, project relatively high levels of petroleum consumption, mostly as a result of higher projections for gasoline consumption. WEFA and GRI project the lowest petroleum consumption in 2010 at around 21.5 million barrels per day. DRI projects the highest consumption in 2010, followed by IPAA, the *AEO2001* low oil price case, and the *AEO2001* reference case. DRI has the highest 2020 consumption projection, followed closely by the *AEO2001* low oil price case. The WEFA consumption projection is significantly lower than all other forecasts for 2020, mainly because WEFA expects lower consumption of transportation fuels. Despite a wide range of oil price assumptions, the three *AEO2001* cases show limited variation in their projections for gasoline consumption. The three *AEO2001* cases show significantly more distillate fuel consumption than do WEFA and DRI, mainly attributable to a higher projected rate of increase in freight travel.

The projections of net petroleum imports in the *AEO2001* low oil price case are well above those in the other forecasts, reflecting low production and high consumption projections. The projected percentage of petroleum consumption from imports, which is an indicator of the relative direction of production, net imports, and consumption, is also highest in the *AEO2001* low oil price case, followed by the DRI forecast. For 2010 the projected import share of consumption ranges from 52 percent (WEFA and IPAA) to 66 percent (*AEO2001* low oil price case). In 2020 all the forecasts show increased reliance on imports, with the highest projection being 70 percent in the *AEO2001* low oil price case. WEFA projects the lowest share of imports in 2020 at 56 percent, because it projects significantly lower petroleum consumption than in the other forecasts. WEFA actually projects lower import shares than were projected in its own forecast last year for both 2010 and 2020 and is the only forecast with lower projected import shares than last year.

Coal

The coal forecast by DRI is the most similar to the *AEO2001* coal forecasts; however, the coal forecasts by DRI, WEFA and GRI/Hill [96] all project lower production and overall consumption than does *AEO2001* (Table 28). The differences stem from differences in assumptions related to expected economic activity and sectoral growth in electricity demand and whether the forecast includes the effects of emissions limits proposed by the U.S. Environmental Protection Agency, which could force the retirement of many older coal plants. *AEO2001* represents the provisions of the State implementation plan (SIP) call for 19 States where NO_x caps were finalized but does not incorporate revised limits on emissions of particulate matter. The DRI forecast projects substantial gains in efficiency for coal-fired generators.

Table 28. Comparison of coal forecasts (million short tons, except where noted)

EIA projects growing domestic consumption over the forecast horizon in

combination with shrinking real coal prices. DRI expects some expansion of electricity and industrial sector coal consumption followed by declines beginning after 2010. Similarly, GRI/Hill predicts increases in coal consumption until 2013 followed by a decline. WEFA is the most pessimistic about coal consumption in the electricity generation and industrial sectors.

The differences among the forecasts for coal exports are significant. U.S. coal exports declined from 90 million tons in 1996 to 58 million tons in 1999, and net coal exports in 1999 (after adjustment for imports) were 49 million tons. EIA expects net exports to decline to 35 million tons in 2015 and remain approximately at that level through 2020. GRI/Hill projects an even more dramatic decline in net exports to 4 million tons in 2015 and 2 million tons in 2020, reflecting declining coal demands by importing countries and strong competition from other producers such as Australia, South Africa, and Colombia. The projections for a long-term decline in exports are based primarily on the inability of the U.S. mining industry to keep pace with strong price competition by other exporters and the loss of markets as Europe moves away from coal for environmental reasons. Both DRI and WEFA, however, project relative stability in U.S. net coal exports, at 57 million tons in 2015 and 55 million tons in 2020 (DRI) and 51 million tons in 2015 and 52 million tons in 2020 (WEFA).

The *AEO2001* and WEFA price forecasts for national average minemouth coal prices (all shown in 1999 dollars) are fairly close. The GRI/Hill minemouth price projections are somewhat lower than the other forecasts because they exclude exported and metallurgical coal in the calculation. (Exported and metallurgical coal tend to be more expensive.) In dollars per million Btu, WEFA's slightly lower projected prices at $0.62 in 2015 and $0.59 in 2020 indicate a slightly higher average Btu per ton conversion factor, which in turn indicates a higher proportion of bituminous (over subbituminous) coal in the WEFA forecast.

The coal forecasts reviewed provide a broad range of views, reflecting the great uncertainties facing the U.S. coal industry as it must simultaneously adapt to the financial pressures arising from increasing environmental restrictions on coal use (both here and in Europe), deregulation of the U.S. electricity generation industry, and increasing competition from the younger coal fields of international competitors. The uncertainties are, and will continue to be, passed on to U.S. coal producers in the form of demands for higher quality products at ever lower prices.

If you would like to received any information relating to any of our reports via e-mail, click on the link labeled "Projections ListServ" to Join by entering your e-mail address.

Page last modified on 06/29/2001 08:44:12

URL: http://www.eia.doe.gov/oiaf/aeo/forecast.html

Need Help Now?

Call the National Energy Information Center (NEIC)

(202) 586-8800 9AM - 5PM eastern time

Specialized Services from NEIC

If you are having technical problems with this site, please contact the EIA Webmaster at wmaster@eia.doe.gov

---

This document contains the following shortcuts:

2007.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00
TOTAL CHEMICALS	12.00 MO	0	0	24,598	1,500	0	26,098	2174.86

2007.45. DISPOSALS

2007.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	60.00 CY	0	0	0	2,400	0	2,400	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	90.00 TON	0	0	0	5,400	0	5,400	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	7,800	0	10,800	900.00

2007.45.10. CARBON (GAC, VAPOR PHASE)
Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.

USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	1004.00 LBS	0	0	0	462	0	462	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	462	0	462	38.49

2007.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	9788.00 LBS	0	0	0	3,915	0	3,915	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,915	0	3,915	326.27

2007.45.20. PPE & MISC
Assumed disposed at local or regional RCRA landfill.

USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00

2007.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2007.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2007.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	91,977	0	104,677	8723.09
2007.49. SAMPLING & ANALYSIS								
2007.49. 5. PERFORMANCE MONITORING								
2007.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment 202 samples/8 per chest = 26 shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02

John Spear
10/26/01 12:08 PM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Calculation of T&D costs

Harry, I think I copied you on the quote from Clean Harbors. If not let me know. This is a dressed up version of my calculations.

Jack

T&D calculations.xls

McCORMICK & BAXTER

10/25/01

CALCULATIONS OF T&D COSTS BASED ON QUOTE FROM CLEAN HARBORS
USED IN THE CD ESTIMATES

CARBON (GAC) DISPOSAL COSTS	QUOTED UNIT COSTS	VAPOR PH	LIQUID PHASE
Disposal (per pound)		0.350	0.290
Transportation			
Cost per load (say 30,000#/load	4,435.00		
Cost per pound		0.148	0.148
RO/RO Rental (say 30 days/load)	270.00		
Cost per pound		0.009	0.009
Liner	50.00		
Cost per pound		0.002	0.002
Haz Fee	1.92/ton	0.001	0.001
TOTALS		0.509	0.450
	Say for est.	0.520 per #	0.460

NAPL DISPOSAL COSTS		
Disposal 0.12/# at 8.5#/gal		1.020
Transportation		
Cost per load (5000 gal/load	4,620.00	
Cost per gallon		0.924
Loading/Unloading Demurrage Say 2 hours extra/loac	170.00	0.034
TOTALS		1.978
	Say for est.	1.980 per gal

John Spear
10/25/01 10:11 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP
cc: john_spear@urscorp.com
Subject: Clean Harbors T&D Quote

Harry,
Here is the quote from Clean Harbors for your backup.
Jack
—— Forwarded by John Spear/Cranford/URSCorp on 10/25/2001 01:17 PM ——

rowlandd@cleanharbors.com (Rowland, Dave)
10/24/2001 06:14 PM

To: '"john_spear@urscorp.com"' <john_spear@urscorp.com>
cc:
Subject: Stockton project

John;

I hope this helps. Call me with any questions

<<URS- CA NJ.doc>>

Dave Rowland
Clean Harbors Environmental Services
800-462-4678 Ext 228

URS- CA NJ.doc

July 3, 2001

URS Corporation
12 Commerce Drive
Cranford, NJ 07016
Attn. Jack Spear

Re: Budgetary numbers- Creosote Liquids

Dear Jack

Thank you for the opportunity to provide this budgetary estimate for the transportation and disposal of Creosote contaminated liquids coming from your California site. Although this project is merely in the planning stages, the cost estimates below should assist in your planning efforts.

Similar to wastes generated at other remediation sites, Clean Harbors (CHES) is familiar with ceosote contamination and we are looking forward to further discussions pertinent to this project. As you move forward, please don't hesitate to contact me with any questions you may have.

As mentioned, Creosote contaminated waste is suitable for incineration at our RCRA/CERCLA approved incinerator in Kimball, NE. Because of its relative proximity to the site, and our ability to receive both liquids and solids via rail, Kimball offers significant advantages over other disposal sites.

In the past two years, our Kimball, NE fluidized- bed incinerator has undergone several improvements that have led to record breaking incineration levels. Since our initial purchase of the incinerator in 1995, CHES has enhanced the feed and processing capabilities, added shredders and permitted pad storage space, replaced refractory linings and has recently completed construction of our second of six permitted monofills. These improvements will enable CHES to continue to incinerate wastes well into the millenium.

The inherent design of a fluidized bed incinerator enables CHES to offer aggressive pricing to customers requiring incineration of bulk solids, sludges and liquids. Additionally, Kimball is the <u>only</u> incinerator in the United States that is capable of delisting the ash produced from the incineration process, virtually eliminating long-term liability associated with hazardous waste landfills.

Attached you will find transportation and disposal pricing based upon the general knowledge of contaminated material from previous projects.

Our fleet of transportation equipment, coupled with our selected subcontracted transportation companies enables Clean Harbors to transport a variety of hazardous wastes without offloading demurrage, often reducing demurrage costs with a streamlined coordination effort. For this project we can utilize 5,000 gallon vacuum trailers from our Kimball site or Thousand Oaks, CA location. Further, we may utilize local approved subcontractors for proper transportation of your waste.

As you move forward with the planning of this project please contact us with any planning or logistical questions you may have. We are eager to work with you and will be contacting you soon to follow up on this quotation. If you have any questions in the meantime, please contact us at the Denver office at 1-800-462-4678 Ext, 228.

Sincerely,

Dave Rowland

Senior Account Manager

URS Corporation **July 3, 2001**

I. DISPOSAL:

a. Creosote contaminated Liquids **$0.08-$0.16/lb/lb.**
Minimum charge applies per load

General Specifications

FB1K BULK LIQUID/ENERGETIC FOR KIMBALL
BTU 6,000 - 10,000/lb
Metals within normal feed rates
Halogen less than 5%
Sulfur less than 3%
No pesticides/level A requirements
Na/K/Mg/P each less than .5%
Ash less than 5%
Settleable solids less than 5%
Viscosity of #4 fuel oil or better
PRIMARY DISPOSAL METHOD: DESTRUCTION INCINERATION

b. Creosote Contaminated Carbon- Vapor Phase
$0.34- $0.36/lb-
Bulk Quantity

c. Creosote Contaminated Carbon- Liquid Phase
$0.26 - $0.32/lb
Bulk Quantity

General Specifications

FB5 SOLID FUEL NOT PROCESSABLE (DEBRIS)
Less than 10% metal pieces
All metal pieces less than 6 inches longest dimension
No metal fines
Less than 30% inorganic material
Less than 10% halogens
Less than 50 ppm PCB's, non-TSCA regulated
Less than 4% sulfur
Greater than 5000 BTU's/lb
No pesticides
Non-dispersible solids (e.g. cured resins, rags, filters)
PRIMARY DISPOSAL METHOD: FUELS BLENDING

II. TRANSPORTATION

From Stockton to Kimball

a.	**Liquids to Kimball**	$4,620.00 per load Loading time: 2hrs $85.00/hr thereafter
b.	**Rolloffs to Kimball**	$4,435.00/load
c.	**Spot Fee**	TBD
d.	**Roll-off Rental**	$9.00/Day
e.	**Roll-off Liner**	$50.00/each

NOTE- scheduling of roll-off wastes into Kimball is most efficient when performed in a drop and swap mode. CHES will provide an empty roll-off to each driver upon delivery of full box.

III. State Hazardous Fee: NE- $1.92/Ton

IV. Analysis:

Basic Waste Approval fee	$75.00- WAIVED UPON FIRST SHIPMENT (Specific analysis, if needed will be additional)

The aforementioned prices are based upon the following conditions & assumptions:

1. Estimate prices only for budgetary needs
2. This project will commence upon agreement of Terms and conditions and a purchase order.
3. CHES will negotiate a mutually agreeable delivery schedule upon award.
4. Materials subject to additional charges if they do not conform to the listed specifications.
5. All containers must be marked with a CHES profile number
6. Client will provide free and clear access to work area for equipment and manpower.
7. Due to recent escalating fuel costs, a temporary 3% OPEC fuel surcharge will be added to each invoice.

We are very proud of our excellent compliance record. When outside disposal services are necessary, CHES only ships to facilities that pass our annual compliance audit, in addition to any disposal restrictions the generator may have. Our fleet of trucks is inspected daily to assure you of safe and dependable transportation of your hazardous waste. In addition, each truck is fitted with a satellite tracking system that enables constant communication with our dispatch personnel.

Finally, we offer waste tracking for all of your wastes through our on-line tracking system. This service is offered on a monthly, quarterly or yearly basis or is available on our Web site at www.Clean Harbors.com. Pricing is firm for 30 days and terms are NET15 commencing the last day of work being performed at the job site listed on the invoice.

Should you have any questions or need additional information, please contact me at 1-800-462-4678 in our Denver Service Center. We sincerely appreciate this opportunity to quote on your waste disposal services.

Metals Feed Limits- ppm

Antimony (Sb)	1,155
Arsenic (As)	75
Barium (Ba)	4,050
Beryllium (Be)	10
Cadmium (Cd)	100
Chromium (Cr)	1,000
Lead (Pb)	7,995
Mercury (Hg)	10.0
Nickel (Ni)	12,450
Selenium (Se)	255
Silver (Ag)	255
Thallium (Tl)	37.5

NOTE:
Wastes must not qualify as Inorganic Metal Bearing Wastes, which EPA prohibits from incineration

Table 7-1
Estimates of GAC Consumption by Liquid Stream Treatment

Visalia data used for scaling				
Liquid pumping rate	400	gpm		
First 6 months average	23,333	lbs/month		
Second year average	16,667	lbs/month		
Third year average	8,333	lbs/month		
Pump-and treat usage	1,667	lbs/month		
McCormick-Baxter estimates	Scenario 1	Scenario 2	Scenario 3	
Pumping rate	475	575	700	gpm
Montly usage 1st yr	27,708	33,542	40,833	lbs/month
Montly usage 2nd yr	23,750	28,750	35,000	lbs/month
Montly usage 3rd yr	14,844	17,969	21,875	lbs/month
Montly usage 4th yr	9,896	11,979	14,583	lbs/month
Usage during cooldown yr 1	5,938	7,188	8,750	lbs/month
Usage during cooldown yr 2	3,958	4,792	5,833	lbs/month
Usage during cooldown yr 3	1,979	2,396	2,917	lbs/month
Estimated total, sacrificial	1,056,875	1,279,375	1,557,500	lbs
Changeout frequency, 10,000 lb primary vessels (times per year)				
Year 1	33	40	49	times
Year 2	29	35	42	times
Year 3	18	22	26	times
Year 4	12	14	18	times
Year 5	7	9	11	times
Year 6	5	6	7	times
Year 7	2	3	4	times
Estimated regeneration frequency (times per month)[1]				
Year 1	6	7	8	times
Year 2	5	6	7	times
Year 3	3	4	4	times
Year 4	2	2	3	times
Year 5	1.2	1.4	1.8	times
Year 6	0.8	1.0	1.2	times
Year 7	0.4	0.5	0.6	times
Estimated carbon usage using regeneration on-site[2]				
Year 1	33,250	40,250	49,000	lbs
Year 2	28,500	34,500	42,000	lbs
Year 3	17,813	21,563	26,250	lbs
Year 4	11,875	14,375	17,500	lbs
Year 5	7,125	8,625	10,500	lbs
Year 6	4,750	5,750	7,000	lbs
Year 7	2,375	2,875	3,500	lbs
Estimated total, regeneration on-site	105,688	127,938	155,750	lbs
1) Assumed that the vessels are regenerated when they are 50% loaded				
2) The carbon will be replaced after 20 regeneration cycles				

2007.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)	14.00	EA	0.00 0	0.00 0	304.16 4,258	0.00 0	0.00 0	304.16 4,258	304.16
USR AA TOC (9060)	58.00	EA	0.00 0	0.00 0	0.00 0	55.00 3,190	0.00 0	55.00 3,190	55.00
USR AA PCP (8270 mod)	14.00	EA	0.00 0	0.00 0	0.00 0	155.00 2,170	0.00 0	155.00 2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
2007.49.10. COMPLIANCE MONITORING									
2007.49.10. 5. FUGITIVE EMISSIONS									
USR AA Air Monitoring Stations, Sampling Equipment, Yearly Al low	5.00	EA	0.00 0	5000.00 25,000	0.00 0	0.00 0	0.00 0	5000.00 25,000	5000.00
RAD AA Calibration Engineer At Site Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00	EA	0.00 0	0.00 0	925.00 3,700	0.00 0	0.00 0	925.00 3,700	925.00
USR AA Calibration Gasses	1.00	LS	0.00 0	0.00 0	200.00 200	0.00 0	0.00 0	200.00 200	200.00
USR AA Tedlar Bags	12.00	MO	0.00 0	0.00 0	200.00 2,400	0.00 0	0.00 0	200.00 2,400	200.00
USR AA PAH (air)	40.00	EA	0.00 0	0.00 0	0.00 0	220.00 8,800	0.00 0	220.00 8,800	220.00
USR AA PCP (air)	40.00	EA	0.00 0	0.00 0	0.00 0	200.00 8,000	0.00 0	200.00 8,000	200.00
USR AA PM10 (air)	40.00	EA	0.00 0	0.00 0	0.00 0	35.00 1,400	0.00 0	35.00 1,400	35.00
USR AA Metals (air)	40.00	EA	0.00 0	0.00 0	0.00 0	60.00 2,400	0.00 0	60.00 2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00	MO	0	25,000	6,300	20,600	0	51,900	4325.00

2007.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2007.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	55.00 EA	0	0	0	7,700	0	7,700	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2007.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00

2007.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2007.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2007.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2007.49.10.25. SAMPLING TECHNICIANS								
2007.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2007.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20

2007.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2007.55. QC & ANALYTICAL DATA VALIDATION								
2007.55. 5. DATA VALIDATION								
2007.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2007.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2007.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
2007.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 1	1.00 JOB	1,089,932	64,060	71,668	631,891	1,308,793	3,166,345	3166345.30

Kathryn Carpenter
06/29/01 07:57 AM

To: Harry Ehlers/Seattle/URSCorp@URSCORP, Wendy LS Oresik/Seattle/URSCorp@URSCORP, John Spear/Cranford/URSCorp@URSCORP
cc:
Subject: M&B CD Compliance Monitoring analytical unit costs

Good Morning,

Here is a spreadsheet with unit costs for soil/solid, NAPL, GW, and air/vapor samples. Let me know if I missed anything or you need more backup. One thing we need to figure out is how to monitor for ozone. Can this be done with an onsite monitor? The AirToxics lab does not do this test so I suspect it needs to be done in the field.

compliance monitoring analysis unit cost

Kathryn A. Carpenter, MS
Senior Environmental Chemist
URS Corporation
1501 4th Ave., Suite 1400
Seattle, WA 98101-1616
(206) 438-2053 (phone)
(206) 438-2699 (fax)

Analyte	Method	NAPL	Soil/Solids	GW	Air/Vapor
TOC	9060			$55	
TPH	TPH-Dx	$87	$70	$60	
PAHs *	8310	$203	$161	$140	$220
PCP *	8270 mod	$225	$180	$155	$200
Metals (As, Cu, Cr, Zn)	6000/7000		$45	$40	
TCLP (metals, VOC, SVOC)	TCLP		$740		
Dioxin/Furans	8290			$950	
Natural Attenuation Parameters (dissolved methane, ethane, ethene)	RSK 175			$75	
TO13 (SVOC compounds)	TO13				$275
Carbon dioxide	ASTM D-1946				$115
Carbon monoxide	ASTM D-1946				incl.
Sulfur oxides	ASTM D-1946				$150
NO2	ASTM D-1946				incl.
O3	TBD				TBD
VOC	ASTM D-1946				$220
PM10	PM10				$35

References:
Unit costs for NAPL, soil/solids, and GW from URS Cost Estimating Database (June 2001)
Unit costs for air/vapor from AirToxics
* PCP and PAHs for air/vapor included in TO13 - this price is for reporting PCP or PAHs only

Table 6-1
Overview of Sampling Frequency for Subsurface ERT and Temperature Monitoring

	General Site Coverage		Vertical Plane South of Slough		Horizontal Plane Under Slough	New P&T Extraction Wells	New P&T Monitoring Wells
Phase	**ERT**	**DTS**	**ERT**	**DTS**	**ERT**	**DTS**	**DTS**
Heat-up	Weekly	Daily	Weekly	Daily	Daily	Daily	Daily
Flushing/cycling	Monthly	Weekly	Monthly	Weekly	Daily	Weekly	Weekly
Cool-down	Quarterly	Monthly	Quarterly	Monthly	Weekly	Monthly	Monthly
Long-term monitoring	NA	NA	NA	NA	NA	NA	Quarterly

Table 6-2
National Ambient Air Quality Standards

Constituent	Standard Value (mg/m³)	Standard Type
CO		
1- Hour average	40 mg/m³	Primary
8-Hour average	10 mg/m³	Primary
NO_2		
Annual arithmetic mean	100	Primary and secondary
O_3		
1-Hour average	235	Primary and secondary
8-Hour average	157	Primary and secondary
Pb		
Quarterly average	1.5	Primary and secondary
PM_{10}		
Annual arithmetic mean	50	Primary and secondary
24-Hour average	150	Primary and secondary
SO_2		
Annual arithmetic mean	80	Primary
24-Hour average	365	Primary and secondary
3-Hour average	1,300	Primary and secondary

Note: Units in microgram per cubic meter of air, unless otherwise noted.

Table 6-3
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per year[a]
Performance Monitoring – Steam Phase					
ERT data	Subsurface	Temperature	Daily/weekly/ monthly (see Table 6-1)	41 to 63 vertical 4 horizontal	NA
Electrical	System	Amps and power	Weekly	59 ERH electrodes	NA
Temperature/DTS distribution	Wellhead	Temperature	Daily/weekly (see Table 6-1)	301 to 416 wells	NA
Steam distribution	Wellhead	Liquid flow	Continuous	169 to 249	NA
	Wellhead, boiler plant, treatment plant	Pressure	Continuous	200 to 300	NA
Contaminant removal rate	NAPL (at wellhead)	Volume	Weekly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Weekly	4 to 6	NA
		TOC	Weekly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA
Well installation soil borings[b]	Soil	Visual	Initial	20	20
		TPH	Confirmation	20	20
		PAHs	Confirmation	20	20
		PCP	Confirmation	20	20
Interim drill-back soil borings	Soil	TPH	Annual[c]	50[d]	50[d]
		PAHs	Annual[c]	50[d]	50[d]
		PCP	Annual[c]	50[d]	50[d]
Groundwater monitoring[b]	Water	TOC	Initial	60	60
		PAHs	Initial	60	60
		PCP	Initial	60	60
		Metals[e]	Initial	60	60
		Dioxins/furans	Initial	10	10
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Cool Down Phase					
Temperature/DTS distribution	Subsurface	Temperature	Monthly (see Table 6-1)	301 to 416 wells	NA
Contaminant removal rate	NAPL (at well-head)	Volume	Monthly	132 to 167	NA
	Contaminated water	Flow	Continuous	132 to 167	NA
		Volume	Monthly	4 to 6	NA
		TOC	Monthly	4 to 6	NA
	Vapor	Flow	Continuous	4 to 6	NA
		CO_2	Continuous	4 to 6	NA
		PAHs	Continuous	4 to 6	NA
		PCP	Continuous	4 to 6	NA

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[a]
Performance Monitoring – Cool Down Phase (Continued)					
Groundwater treatment plant monitoring	Water	TOC	Weekly	1	52
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
Compliance Monitoring – Steam Phase					
Boiler air emissions/ stack monitoring	Gas	VOCs	Initial	1	4[f]
		SVOCs[g]	Initial	1	4[f]
		Dioxins/furans	Initial	1	4[f]
		Metals[h]	Initial	1	4[f]
		PM	Initial	1	4[f]
		HCl	Initial	1	4[f]
		Cl_2	Initial	1	4[f]
		Total hydrocarbons	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
		Opacity	CEMS	1	NA
		CO	CEMS	1	NA
		SO_x	CEMS	1	NA
		NO_x	CEMS	1	NA
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Monthly	3	36
		PCP	Monthly	3	36
		PM_{10}	Monthly	3	36
		Metals	Monthly	3	36
		CO	CEMS	3	NA
		SO_x	CEMS	3	NA
		NO_2	CEMS	3	NA
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Quarterly	1	4
		PAHs	Quarterly	1	4
		PCP	Quarterly	1	4
		Metals[e]	Quarterly	1	4
		Dioxins/furans	Quarterly	1	4
	Solids (well)	TCLP[i]	Quarterly	1	4
	Solids (SAC)	TCLP[i]	Quarterly	1	4
	Solids (sludge)	TCLP[i]	Quarterly	1	4
	Solids (spent filter media)	TCLP[i]	Quarterly	1	4
Perimeter groundwater monitoring	Water	PAHs	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

Characteristic	Media	Analyte	Frequency	No. of Sampling Points	Total No. per Year[d]
Cool Down Phase					
Site fugitive emissions/air quality perimeter monitoring	Air	PAHs	Quarterly	3	12
		PCP	Quarterly	3	12
		PM	Quarterly	3	12
Treatment plant discharge (groundwater re-injection)	Water	TPH	Monthly	1	12
		PAHs	Monthly	1	12
		PCP	Monthly	1	12
		Metals[e]	Monthly	1	12
		Dioxins/furans	Quarterly	1	4
Waste disposal characterization	NAPL	TPH	Annually	1	1
		PAHs	Annually	1	1
		PCP	Annually	1	1
		Metals[e]	Annually	1	1
		Dioxins/furans	Annually	1	1
	Solids (well)	TCLP[i]	Annually	1	1
	Solids (SAC)	TCLP[i]	Annually	1	1
	Solids (sludge)	TCLP[i]	Annually	1	1
	Solids (spent filter media)	TCLP[i]	Annually	1	1
Perimeter groundwater monitoring	Water	TPH	Semi-annual	25	50
		PCP	Semi-annual	25	50
		Metals[e]	Semi-annual	25	50
		Dioxins/furans	Semi-annual	25	50
Confirmational Sampling					
Soil borings	Soil	LIF survey	Final	4 weeks	4 weeks
		NAPL mobility leach test[j]	Final	10	10
		TPH	Final	10	10
		PAHs	Final	10	10
		PCP	Final	10	10
Long-Term Monitoring (Phase 2)					
Groundwater monitoring (perimeter and treatment zones)	Water	PAHs	Annually	25	25
		PCP	Annually	25	25

Table 6-3 (Continued)
Performance and Compliance Monitoring and Confirmational Sampling

[a]Total number of samples does not include QA samples. QA samples are 10% per batch.
[b]Includes baseline sampling and analysis during system (e.g., wells) installation.
[c]Will be conducted for years 2, 3, and 4 (i.e., 3 times over the course of the steam treatment period).
[d]Assumes 5 samples from each of 10 borings.
[e]Metals include As, Cr, Cu, and Zn.
[f]Includes 3 samples taken from 1 boiler stack and 1 blank.
[g]SVOCs include PAHs and PCP.
[h]40 CFR 266.106 provides standards to control metals emissions. Subpart I regulated metals include Ag, As, Ba, Be, Cd, Cr, Hg, Pb, Sb, and Th. Of these metals, As and Cr are of concern at the site.
[i]Leachate from TCLP analyzed for As, Cr, and SVOCs
[j]NAPL Mobility Product Leaching Study, methodology leach test to be determined.

Notes:
Performance monitoring: Monitor system performance during remediation. Includes steam phase and cool-down period.
Compliance monitoring: Monitor compliance with disposal/discharge requirements. Includes steam phase and cool down period.
Confirmational sampling: To confirm "long-term effectiveness" of the remediation performed.

Ag: silver
As: arsenic
Ba: barium
Be: beryllium
CEMS: continuous emissions monitoring system
Cd: cadmium
CO: carbon monoxide
CO_2: carbon dioxide
COCs: chemicals of concern (PAHs, PCP, dioxins/furans, As, Cr, Cu, and Zn)
Cl_2: chlorine gas
Cr: chromium
Cu: copper
HCl: hydrogen chloride
Hg: mercury
LIF: laser-induced fluorescence
NO_x: nitrogen oxides
O_3: ozone
PAHs: polynuclear aromatic hydrocarbons
Pb: lead
PCP: pentachlorophenol
PM: particulate matter
SAC: spent activated carbon
Sb: antimony
SO_x: sulfur oxides
SVOCs: semivolatile organic compounds
TAPs: toxic air pollutants
TCLP: toxicity characteristics leaching procedure
Th: thallium
TOC: total organic carbon
TPH: total petroleum hydrocarbons
VOCs: volatile organic compounds
Zn: zinc

Table 6-5
Perimeter Monitoring Wells to Be Sampled

Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
1	7	6	6	3	3
2	7	6	4	3	3
3	7	6	4	3	3

Table 6-6
Perimeter Monitoring Frequency

Years[1]	Scenario	Zone A	Zone B	Zone C	Zone D	Zone E
0-7	1	Semi-annually				
	2					
	3					
7-30	1	Annually	Annually	Annually	5-years	5-years
	2	Annually	Annually	Annually	5-years	5-years
	3	Annually	Annually	Annually	5-years	5-years

[1]Years are from start of thermal remediation.

2008. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008. HEAT YR2 STEP 1								
2008. 5. GENERAL CONDITIONS								
2008. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2008. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2008.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2008.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2008.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2008.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Spare Parts/Maintenance		0.00	0.00	500.00	0.00	0.00	500.00	
	12.00 MO	0	0	6,000	0	0	6,000	500.00
USR AA Well Maintenance		0.00	0.00	0.00	1500.00	0.00	1500.00	
	1.00 LS	0	0	0	1,500	0	1,500	1500.00
TOTAL MAINTENANCE	12.00 MO	0	0	16,000	14,500	0	30,500	2541.67

2008.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Electricity for Electrodes		0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	8760.00 KKW	0	0	0	0	525,600	525,600	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	8760.00 KKW	0	0	0	0	-525,600	-525,600	-60.00
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	198303 MBT	0	0	0	0	694,061	694,061	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	29434 UNT	0	0	0	0	23,547	23,547	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	987,584	987,584	82298.64
2008.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

2008.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	9643.00 LB	0	0	9,643	0	0	9,643	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	2900.00 LB	0	0	4,350	0	0	4,350	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10730 LB	0	0	1,610	0	0	1,610	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	26680 LB	0	0	1,067	0	0	1,067	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	17400 LB	0	0	1,740	0	0	1,740	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	870.00 LB	0	0	1,549	0	0	1,549	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00
TOTAL CHEMICALS	12.00 MO	0	0	24,598	1,500	0	26,098	2174.86
2008.45. DISPOSALS								
2008.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	60.00 CY	0	0	0	2,400	0	2,400	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	90.00 TON	0	0	0	5,400	0	5,400	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	7,800	0	10,800	900.00

2008.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	1004.00 LBS	0	0	0	462	0	462	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	462	0	462	38.49
2008.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	9788.00 LBS	0	0	0	3,915	0	3,915	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,915	0	3,915	326.27
2008.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2008.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2008.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2008.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	91,977	0	104,677	8723.09
2008.49. SAMPLING & ANALYSIS								
2008.49. 5. PERFORMANCE MONITORING								
2008.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2008.49.10. COMPLIANCE MONITORING								
2008.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2008.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2008.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2008.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2008.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2008.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2008.49.10.25. SAMPLING TECHNICIANS

2008.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2008.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2008.55. QC & ANALYTICAL DATA VALIDATION								
2008.55. 5. DATA VALIDATION								
2008.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2008.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2008.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2008.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2008.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 1	1.00	JOB	1,089,932	64,060	71,668	285,467	1,001,248	2,512,376	2512375.60

2009. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009. HEAT YR3 STEP 1 & WELLS STEP 2								
2009. 5. GENERAL CONDITIONS								
2009. 5.01. FIELD SUPERVISION & MANAGEMENT								
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	692.00 HR	30,081	0	0	0	0	30,081	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	692.00 HR	36,766	0	0	0	0	36,766	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	692.00 HR	13,369	0	0	0	0	13,369	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	692.00 HR	25,625	0	0	0	0	25,625	37.03
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	692.00 HR	35,422	0	0	0	0	35,422	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	692.00 HR	0	3,806	0	0	0	3,806	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume two apartment		0.00	0.00	0.00	0.00	1000.00	1000.00	
s	6.00 MO	0	0	0	0	6,000	6,000	1000.00
for 3 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	180.00 DAY	0	0	0	0	5,130	5,130	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	2.00 EA	0	0	0	0	1,000	1,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	2.00 EA	0	0	0	0	40	40	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	2000.00 MI	0	0	0	0	700	700	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	141,264	3,806	0	0	12,870	157,940	157939.84
2009. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60

2009. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol Officer	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III Health and Safety Manager (CIH)	16.00 HR	1,654	0	0	0	0	1,654	103.40
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M ana	16.00 HR	1,654	0	0	0	0	1,654	103.40
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I - PCS Support	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73

2009. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GENERAL CONDITIONS	12.00 MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2009.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical		0.00	0.00	0.00	1000.00	0.00	1000.00	
Support	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67
2009.12. ENGINEEERING								
USR AA System Evaluation & Engineeri		0.00	0.00	0.00	659472.00	0.00	659472.00	
ng Expansion	1.00 LS	0	0	0	659,472	0	659,472	659472.00
TOTAL ENGINEEERING		0	0	0	659,472	0	659,472	

2009.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2009.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2009.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Spare Parts/Maintenance		0.00	0.00	500.00	0.00	0.00	500.00	
	12.00 MO	0	0	6,000	0	0	6,000	500.00
USR AA Well Maintenance		0.00	0.00	0.00	1500.00	0.00	1500.00	
	1.00 LS	0	0	0	1,500	0	1,500	1500.00
TOTAL MAINTENANCE	12.00 MO	0	0	16,000	14,500	0	30,500	2541.67

2009.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Electricity for Electrodes		0.00	0.00	0.00	0.00	60.00	60.00	
(Assumes 0.06/KWH)	8760.00 KKW	0	0	0	0	525,600	525,600	60.00
USR AA Co-gen System Power Makeup		0.00	0.00	0.00	0.00	-60.00	-60.00	
	8760.00 KKW	0	0	0	0	-525,600	-525,600	-60.00
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	198303 MBT	0	0	0	0	694,061	694,061	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	29434 UNT	0	0	0	0	23,547	23,547	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	987,584	987,584	82298.64
2009.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

2009.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	9643.00 LB	0	0	9,643	0	0	9,643	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	2900.00 LB	0	0	4,350	0	0	4,350	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10730 LB	0	0	1,610	0	0	1,610	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	26680 LB	0	0	1,067	0	0	1,067	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	17400 LB	0	0	1,740	0	0	1,740	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	870.00 LB	0	0	1,549	0	0	1,549	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1160.00 LB	0	0	2,320	0	0	2,320	2.00
TOTAL CHEMICALS	12.00 MO	0	0	24,598	1,500	0	26,098	2174.86
2009.45. DISPOSALS								
2009.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	60.00 CY	0	0	0	2,400	0	2,400	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	90.00 TON	0	0	0	5,400	0	5,400	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	7,800	0	10,800	900.00

2009.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	1004.00 LBS	0	0	0	462	0	462	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	462	0	462	38.49
2009.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	9788.00 LBS	0	0	0	3,915	0	3,915	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	3,915	0	3,915	326.27
2009.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2009.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2009.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2009.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	91,977	0	104,677	8723.09
2009.49. SAMPLING & ANALYSIS								
2009.49. 5. PERFORMANCE MONITORING								
2009.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2009.49.10. COMPLIANCE MONITORING								
2009.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2009.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2009.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2009.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2009.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2009.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	14.00	EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)			0.00	0.00	0.00	950.00	0.00	950.00	
	5.00	EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	2.00	EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	12.00	EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	12.00	EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00	MO	0	0	1,256	10,280	0	11,536	961.35

2009.49.10.25. SAMPLING TECHNICIANS

2009.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	160.00	HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV			33.00	0.00	0.00	0.00	0.00	33.00	
	160.00	HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	600.00	MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.			0.00	0.00	0.00	0.00	198.00	198.00	
	28.00	DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	28.00	DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials			0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00	LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00	QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2009.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2009.55. QC & ANALYTICAL DATA VALIDATION								
2009.55. 5. DATA VALIDATION								
2009.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2009.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2009.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2009.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2009.60. TREATMENT SYSTEM CONSTRUCTION									
2009.60.10. INSTALL WELLS									
2009.60.10. 5. EXTRACTION WELLS THERMAL Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,									
2009.60.10. 5.15. "C" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	2278.00	LFT	0	0	0	307,530	0	307,530	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	307,530	0	307,530	307530.00
2009.60.10. 5.20. "D" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	9052.00	LFT	0	0	0	1,222,020	0	1,222,020	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	1,222,020	0	1,222,020	1222020.00
2009.60.10. 5.30. EXTRACTION PUMPS									
USR AA Extraction Pumps Incl			0.00	0.00	2500.00	0.00	0.00	2500.00	
Controllers	69.00	EA	0	0	172,500	0	0	172,500	2500.00
USR AA 300 SCFM Compressor to run pu			0.00	0.00	25000.00	0.00	0.00	25000.00	
mps	1.00	EA	0	0	25,000	0	0	25,000	25000.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Discharge Tubing Pump to		0.00	0.00	11.00	0.00	0.00	11.00	
Wellhead; SS	9108.00 LFT	0	0	100,188	0	0	100,188	11.00
USR AA Air Supply Tubing Wellhead to		0.00	0.00	6.00	0.00	0.00	6.00	
Pumps	9108.00 LFT	0	0	54,648	0	0	54,648	6.00
USR AA Pulse Counters w/ 4-20 ma Sig		0.00	0.00	395.00	0.00	0.00	395.00	
nal	69.00 EA	0	0	27,255	0	0	27,255	395.00
USR AA Downwell Liquid Level Bubbler		0.00	0.00	2.00	0.00	0.00	2.00	
Tube	9000.00 LFT	0	0	18,000	0	0	18,000	2.00
USR AA Spare Parts; Initial Supply f		0.00	0.00	500.00	0.00	0.00	500.00	
or	1.00 LS	0	0	500	0	0	500	500.00
Pumps								
USR AA Connection Fittings; Air &		0.00	0.00	200.00	0.00	0.00	200.00	
Discharg Tubing/Manifolds, Et	69.00 EA	0	0	13,800	0	0	13,800	200.00
c.								
TOTAL EXTRACTION PUMPS	69.00 EA	0	0	411,891	0	0	411,891	5969.43
2009.60.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps		0.00	0.00	0.00	725.00	0.00	725.00	
	69.00 EA	0	0	0	50,025	0	50,025	725.00
USR AA Install Down-hole Instruments		0.00	0.00	0.00	450.00	0.00	450.00	
	69.00 EA	0	0	0	31,050	0	31,050	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	69.00 EA	0	0	0	81,075	0	81,075	1175.00
2009.60.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	69.00 EA	0	0	0	17,250	0	17,250	250.00
TOTAL WELL TOP COMPLETION	69.00 EA	0	0	0	17,250	0	17,250	250.00
2009.60.10. 5.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	69.00 EA	0	0	0	69,000	0	69,000	1000.00
TOTAL WELL DEVELOPMENT	69.00 EA	0	0	0	69,000	0	69,000	1000.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL EXTRACTION WELLS THERMAL	1.00	JOB	0	0	411,891	1,696,875	0	2,108,766	2108766.00
2009.60.10.10. STEAM INJECTION WELLS									
Injection well pricing includes development, handling of cuttings and liquid wastes,									
2009.60.10.10.15. "C" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	2119.00	LFT	0	0	0	286,065	0	286,065	135.00
TOTAL "C" ZONE WELLS	1.00	JOB	0	0	0	286,065	0	286,065	286065.00
2009.60.10.10.20. "D" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	4034.00	LFT	0	0	0	544,590	0	544,590	135.00
TOTAL "D" ZONE WELLS	1.00	JOB	0	0	0	544,590	0	544,590	544590.00
2009.60.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	10.00	EA	0	0	0	16,250	0	16,250	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	16,250	0	16,250	16250.00
2009.60.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	10.00	EA	0	0	0	2,500	0	2,500	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	2,500	0	2,500	2500.00
2009.60.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	10.00	EA	0	0	0	10,000	0	10,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	859,405	0	859,405	859405.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.60.10.20. MONITORING WELLS								
2009.60.10.20. 5. INSTALL WELLS								
USR AA Install 4" Monitoring Wells,		0.00	0.00	0.00	100.00	0.00	100.00	
SS Casing and Screens	572.00 LFT	0	0	0	57,200	0	57,200	100.00
TOTAL INSTALL WELLS	4.00 EA	0	0	0	57,200	0	57,200	14300.00
2009.60.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT								
M AIR AA Lo Flo Pump & Teflon Tubing		0.00	0.00	550.00	0.00	0.00	550.00	
	4.00 EA	0	0	2,200	0	0	2,200	550.00
USR AA Misc Tools & Sampling Equipme		0.00	0.00	1000.00	0.00	0.00	1000.00	
nt	1.00 EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and		0.00	0.00	0.00	100.00	0.00	100.00	
Discharge/Sampling System	4.00 EA	0	0	0	400	0	400	100.00
USR AA Sample Pump Tubing, Teflon Li		0.00	0.00	3.50	0.00	0.00	3.50	
ned	600.00 LFT	0	0	2,100	0	0	2,100	3.50
USR AA Slip On Well Cap Assbly		0.00	0.00	65.00	0.00	0.00	65.00	
	4.00 EA	0	0	260	0	0	260	65.00
USR AA Flexible Discharge Tubing		0.00	0.00	23.00	0.00	0.00	23.00	
Adaptor	4.00 EA	0	0	92	0	0	92	23.00
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00 JOB	0	0	5,652	400	0	6,052	6052.00
2009.60.10.20.35. INSTALL INSTRUMENTS								
USR AA Install Pumps & Downhole		0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	8.00 EA	0	0	0	13,000	0	13,000	1625.00
TOTAL INSTALL INSTRUMENTS	1.00 JOB	0	0	0	13,000	0	13,000	13000.00
2009.60.10.20.45. WELL TOP COMPLETION								
USR AA Protective Casing & Cap 4" Pi		0.00	0.00	0.00	250.00	0.00	250.00	
pe	4.00 EA	0	0	0	1,000	0	1,000	250.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	1,000	0	1,000	1000.00
2009.60.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	4.00	EA	0	0	0	4,000	0	4,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	4,000	0	4,000	4000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	5,652	75,600	0	81,252	81252.00

2009.60.10.25. TREAT WELL DRILL LIQUIDS/CUTTING

During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.

The liquids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.

USR AA RO/RO MOBE/RENTAL			0.00	0.00	0.00	400.00	0.00	400.00	
	48.00	EA	0	0	0	19,200	0	19,200	400.00
USR AA Frac Tank Rental			0.00	1000.00	0.00	0.00	0.00	1000.00	
	20.00	MO	0	20,000	0	0	0	20,000	1000.00
USR AA Treat Contaminated Water			0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	189000	GAL	0	0	0	47,250	0	47,250	0.25
USR AA Onsite Steam Strip Drill			1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	972.00	TON	1,750	31	0	0	53,460	55,240	56.83
USR AA POTW Customer Charge			0.00	0.00	0.00	207.33	0.00	207.33	
	1.00	LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge			0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.19	MGL	0	0	0	16,829	0	16,829	89044.22
USR AA POTW Collection Charge			0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.19	MGL	0	0	0	2,734	0	2,734	14465.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.05 KLB	0	0	0	2,090	0	2,090	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.08 KLB	0	0	0	1,415	0	1,415	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	1,750	20,031	0	89,726	53,460	164,966	164966.12
2009.60.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83	22.00 EA	0	0	0	3,542	0	3,542	161.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	180.00	0.00	180.00	
70)	22.00 EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	9,416	0	9,416	9416.00
2009.60.10.35. ANALYTICALS LIQUIDS								
Initital baseline samples from monitoring wells and new wells.								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	66.00 EA	0	0	0	9,240	0	9,240	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	66.00 EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	66.00 EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600		0.00	0.00	0.00	55.00	0.00	55.00	
	66.00 EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	11.00 EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00 JOB	0	0	0	36,190	0	36,190	36190.00

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2009.60.10.40. LABOR & ODC's Geologist to work with drillers for soil visual inspection/classification & sampling. Sampling team and equipment to sample wells as well development is completed.									
USR AA Engineer/Scientist IV, Geolog			59.40	0.00	0.00	0.00	0.00	59.40	
ist	160.00	HR	9,504	0	0	0	0	9,504	59.40
USR AA Engineer/Scientist IV, Sampli			59.40	0.00	0.00	0.00	0.00	59.40	
ng Lead	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Technician/Analyst IV, Sampli			33.00	0.00	0.00	0.00	0.00	33.00	
ng Tech	80.00	HR	2,640	0	0	0	0	2,640	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	16.00	HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00	MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging			0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	10.00	DAY	0	0	0	0	1,980	1,980	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	10.00	DAY	0	0	0	0	420	420	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	400.00	LFT	0	0	1,000	0	0	1,000	2.50

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Misc Sampling		0.00	0.00	400.00	0.00	0.00	400.00	
Equipment/Materials	1.00 LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00 JOB	19,061	0	1,400	50	3,134	23,645	23644.80
TOTAL INSTALL WELLS	1.00 JOB	20,810	20,031	418,943	2,767,262	56,594	3,283,640	3283639.92
2009.60.15. PIPING								
2009.60.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	1560.00 LF	11,891	278	9,451	0	0	21,619	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40		9.62	0.52	8.92	0.00	0.00	19.06	
A53	1560.00 LF	19,271	1,037	17,859	0	0	38,168	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40		5.94	0.14	7.18	0.00	0.00	13.26	
A53	520.00 LF	3,964	93	4,796	0	0	8,852	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std		360.80	19.42	125.85	0.00	0.00	506.07	
Wt	5.00 EA	2,316	125	808	0	0	3,249	649.78
MIL PL 6" 90 Degree LR Weld Ell, Std		274.51	6.42	67.81	0.00	0.00	348.74	
Wt	5.00 EA	1,762	41	435	0	0	2,239	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	676.00 LF	6,870	161	2,838	0	0	9,868	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	198.00 EA	42,286	989	7,010	0	0	50,285	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	65.00 EA	2,642	62	225	0	0	2,929	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	130.00 EA	9,909	232	4,290	0	0	14,430	111.00
AIR AA Slip On Flange 6"		158.30	3.70	40.70	0.00	0.00	202.71	
	5.00 EA	792	19	204	0	0	1,014	202.71

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 8" Weld Neck Flange, 150#			156.02	8.40	100.07	0.00	0.00	264.49	
	5.00	EA	1,002	54	642	0	0	1,698	339.59
MIL PL 4" x 3" Reducer, Eccentric			166.64	3.90	26.44	0.00	0.00	196.98	
	130.00	EA	27,814	651	4,414	0	0	32,879	252.91
MIL PL 4" Cap, Welded, Std Wt			83.32	1.95	11.49	0.00	0.00	96.76	
	2.00	EA	214	5	30	0	0	248	124.24
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	386.00	EA	49,552	472	3,733	0	0	53,757	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	11.91	0.00	0.00	131.77	
ets	5.00	EA	762	7	76	0	0	846	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S			118.73	1.13	13.30	0.00	0.00	133.16	
ets	5.00	EA	762	7	85	0	0	855	170.97
USR PL Pipe Supports			59.36	1.39	200.00	0.00	0.00	260.75	
	250.00	EA	19,055	446	64,199	0	0	83,700	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate			256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	1.00	EA	329	3	781	0	0	1,113	1113.50
125 #									
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate			224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	1.00	EA	288	3	469	0	0	761	760.56
125 #									
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate			114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	130.00	EA	19,141	176	37,164	0	0	56,480	434.46
125 #									
USR PL Fit/Cut/Weld 4" pipe to 6" or			237.46	5.55	0.00	0.00	0.00	243.01	
8"	65.00	EA	19,818	463	0	0	0	20,281	312.02
(No Tees required)									
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe			3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	1560.00	LF	7,823	53	5,008	0	0	12,884	8.26
s									
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv			3.91	0.03	1.00	0.00	0.00	4.93	
r	520.00	LF	2,608	18	668	0	0	3,293	6.33
w/Fire Retardant Jackets									
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co			7.81	0.05	1.00	0.00	0.00	8.86	
ver	1560.00	LF	15,645	107	2,003	0	0	17,755	11.38
w/Fire Retardant Jackets									

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL 0.006" Alum Insul Jacket w/Ba		6.25	0.04	0.16	0.00	0.00	6.45	
nds	2200.00 SF	17,651	121	445	0	0	18,216	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00 JOB	284,168	5,621	167,632	0	0	457,421	457421.08
2009.60.15.10. LIQUID RECOVERY SYSTEM								
AIR PL Pipe, Iron, Threaded, Sch 80		7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	1560.00 LF	15,313	140	12,419	0	0	27,872	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	2600.00 LF	26,424	618	10,914	0	0	37,956	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std		96.23	2.25	16.68	0.00	0.00	115.16	
Wt	10.00 EA	1,236	29	214	0	0	1,479	147.86
MIL PL 3"Tee,Full Size Butt Weld Std		143.91	3.37	36.78	0.00	0.00	184.06	
Wt	10.00 EA	1,848	43	472	0	0	2,363	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	193.00 EA	7,846	184	669	0	0	8,698	45.07
AIR PL Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	387.00 EA	39,330	920	10,037	0	0	50,288	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	258.00 EA	15,732	150	1,290	0	0	17,172	66.56
M MIL PL 3" Bronze 125# Gate Valve		70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	5.00 EA	453	4	613	0	0	1,070	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc		23.09	0.19	25.86	0.00	0.00	49.14	
rd	65.00 EA	1,927	16	2,158	0	0	4,101	63.09
Lubricated,Wrench Oper w/Wrench								
M MIL PL 2" Single Disc Type Check Val		37.62	0.33	72.27	0.00	0.00	110.23	
ve	65.00 EA	3,140	28	6,032	0	0	9,199	141.53
IB Wafer Type- 125#								
M MIL PL 2" Bronze 125# Gate Valve		46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	130.00 EA	7,707	65	5,288	0	0	13,059	100.46

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover		4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	1560.00 LF	9,005	61	1,992	0	0	11,058	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	2600.00 LF	15,864	108	4,121	0	0	20,093	7.73
w/Fire Retardant Jackets								
L MIL PL 0.006" Alum Insul Jacket w/Ba		7.81	0.05	0.16	0.00	0.00	8.02	
nds	1144.00 SF	11,473	78	231	0	0	11,783	10.30
USR AA Flexible Hose; SS; 5' long; 2		14.84	0.35	150.00	0.00	0.00	165.19	
"	65.00 EA	965	23	9,750	0	0	10,737	165.19
dia.								
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	162,208	2,503	66,199	0	0	230,910	230909.92

2009.60.15.11. EXTRACTION WELLHEAD SPOOL/FTG

Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho		474.91	11.11	350.00	0.00	0.00	836.02	
p	65.00 EA	30,869	722	22,750	0	0	54,341	836.02
Fabricated)								
USR AA Connection Fittings; Air &		118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La	65.00 EA	7,717	180	0	0	0	7,898	121.50
bor								
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00 JOB	38,586	902	22,750	0	0	62,239	62238.92

2009.60.15.15. STEAM INJECTION SYSTEM

2009.60.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40		8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	1200.00 LF	13,833	140	10,418	0	0	24,391	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac		52.37	0.53	50.23	0.00	0.00	103.13	
k	12.00 EA	807	8	774	0	0	1,589	132.42

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	40.00	EA	1,626	38	139	0	0	1,803	45.07
MIL PL 4" Tee, Red Out Butt Weld Std			249.95	5.85	51.39	0.00	0.00	307.19	
Wt	40.00	EA	12,837	300	2,640	0	0	15,777	394.43
AIR AA Slip On Flange 4"			105.54	2.47	25.70	0.00	0.00	133.70	
	41.00	EA	4,327	101	1,054	0	0	5,482	133.70
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske			99.98	0.95	7.53	0.00	0.00	108.47	
t	41.00	EA	5,263	50	397	0	0	5,710	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En			306.39	2.92	244.12	0.00	0.00	553.44	
ds	5.00	EA	1,967	19	1,567	0	0	3,553	710.60
Bellows w/Int Sleeves&Ext Covers									
MIL PL Pipe Support			76.64	1.58	27.24	0.00	0.00	105.46	
	120.00	EA	11,809	243	4,196	0	0	16,248	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	5.00	EA	217	2	281	0	0	500	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov			5.10	0.03	1.59	0.00	0.00	6.73	
er	1200.00	LF	7,860	54	2,456	0	0	10,370	8.64
w/Fire Retardant Jackets									
MIL PL 0.006" Alum Insul Jacket w/Ba			8.93	0.06	0.16	0.00	0.00	9.15	
nds	600.00	SF	6,877	47	121	0	0	7,045	11.74
			---	---	---	---	---	---	
TOTAL MAIN HEADER PIPING	1.00	JOB	67,424	1,002	24,043	0	0	92,468	92467.85
2009.60.15.15.10. LATERAL PIPING									
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	800.00	LF	8,130	190	3,358	0	0	11,679	14.60
AIR AA Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	318.00	EA	25,170	589	6,424	0	0	32,183	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	396.00	EA	24,147	230	1,980	0	0	26,357	66.56

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 3" Tee, Red Out Butt Weld Std		143.91	3.37	36.94	0.00	0.00	184.22	
Wt	5.00 EA	924	22	237	0	0	1,183	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En		263.84	2.51	209.44	0.00	0.00	475.79	
ds	40.00 EA	13,551	129	10,757	0	0	24,436	610.90
Bellows w/Int Sleeves&Ext Covers								
MIL PL 3" OD Snap-On Plastic Valve T		19.53	0.16	6.00	0.00	0.00	25.70	
ag	160.00 EA	4,013	34	1,232	0	0	5,279	32.99
Includes Insulation								
MIL PL NDT, X-Ray Welds of 3" Dia Pi		50.79	0.45	30.00	0.00	0.00	81.24	
pe	20.00 EA	1,304	12	770	0	0	2,086	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	5.00 EA	9,869	88	0	0	0	9,956	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	800.00 LF	4,881	33	1,268	0	0	6,182	7.73
w/Fire Retardant Jackets								
M MIL PL 3" Pipe Support		57.13	1.18	20.00	0.00	0.00	78.31	
	40.00 EA	2,934	60	1,027	0	0	4,022	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di		61.16	0.56	56.88	0.00	0.00	118.60	
sc	80.00 EA	6,282	58	5,843	0	0	12,182	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer								
M MIL PL 3" Flg St Press Regul&Reducer		128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	40.00 EA	6,592	154	100,861	0	0	107,608	2690.19
Sgl Seat,Sprg Load Dir Act Diap								
M MIL PL 3" Twin Disc Type Check Valve		45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	40.00 EA	2,312	22	3,279	0	0	5,613	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T		25.39	0.21	18.68	0.00	0.00	44.29	
hrd	40.00 EA	1,304	11	959	0	0	2,275	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	240.00 EA	9,756	228	832	0	0	10,816	45.07

2009.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	80.00	EA	3,478	29	4,492	0	0	7,999	99.99
TOTAL LATERAL PIPING	1.00	JOB	128,595	1,924	143,320	0	0	273,838	273838.47
2009.60.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	40.00	EA	9,498	222	20,000	0	0	29,720	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	9,498	222	20,000	0	0	29,720	29720.35
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	205,517	3,147	187,362	0	0	396,027	396026.67
TOTAL PIPING	1.00	JOB	690,479	12,174	443,943	0	0	1,146,597	1146596.60
TOTAL TREATMENT SYSTEM CONSTRUCTION			711,290	32,204	862,886	2,767,262	56,594	4,430,237	
TOTAL HEAT YR3 STEP 1 & WELLS STEP	1.00	JOB	1,942,486	100,070	934,555	3,712,201	1,070,712	7,760,024	7760023.96

2010. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010. HEAT YR1 STEP 2									
2010. 5. GENERAL CONDITIONS									
2010. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

2010. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2010.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2010.12. ENGINEEERING	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010.12. ENGINEEERING								
USR AA System Evaluation & Engineeri		0.00	0.00	0.00	659472.00	0.00	659472.00	
ng Expansion	1.00 LS	0	0	0	659,472	0	659,472	659472.00
TOTAL ENGINEEERING		0	0	0	659,472	0	659,472	
2010.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2010.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2010.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00

2010.25. MAINTENANCE	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Spare Parts/Maintenance		0.00	0.00	600.00	0.00	0.00	600.00	
	12.00 MO	0	0	7,200	0	0	7,200	600.00
USR AA Well Maintenance		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
TOTAL MAINTENANCE	12.00 MO	0	0	17,200	16,000	0	33,200	2766.67

2010.30. UTILITIES

Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.

Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.

Makeup water requirements.
Costed at 0.80/750 gallon unit per local utilit

USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	333472 MBT	0	0	0	0	1,167,152	1,167,152	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	42048 UNT	0	0	0	0	33,638	33,638	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,470,766	1,470,766	122563.87

2010.35. SITE O&M LABOR & MISC EQUIPMENT

USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99

2010.35. SITE O&M LABOR & MISC EQUIPME	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2010.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	12091 LB	0	0	12,091	0	0	12,091	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	3636.00 LB	0	0	5,454	0	0	5,454	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	13453 LB	0	0	2,018	0	0	2,018	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	33451 LB	0	0	1,338	0	0	1,338	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	21816 LB	0	0	2,182	0	0	2,182	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1091.00 LB	0	0	1,942	0	0	1,942	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
TOTAL CHEMICALS	12.00 MO	0	0	30,841	2,000	0	32,841	2736.71
2010.45. DISPOSALS								
2010.45. 5. SLUDGE								
Sludge assumed to be disposed at a regional (CA) RCRA landfill.								
USR AA Transport Sludge to Disposal		0.00	0.00	0.00	40.00	0.00	40.00	
Site	73.00 CY	0	0	0	2,920	0	2,920	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	109.00 TON	0	0	0	6,540	0	6,540	60.00

2010.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	9,460	0	12,460	1038.33
2010.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	3636.00 LBS	0	0	0	1,673	0	1,673	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	1,673	0	1,673	139.38
2010.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	12090 LBS	0	0	0	4,836	0	4,836	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	4,836	0	4,836	403.00
2010.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2010.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00

2010.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	97,269	0	113,479	9456.55
2010.49. SAMPLING & ANALYSIS								
2010.49. 5. PERFORMANCE MONITORING								
2010.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61

2010.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83	52.00 EA	0	0	0	8,372	0	8,372	161.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	180.00	0.00	180.00	
70)	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig		0.00	0.00	0.00	3000.00	0.00	3000.00	
Mobe/Demobe	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle		0.00	0.00	0.00	34.00	0.00	34.00	
Cuttinigs, Regrout Holes	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geolog		59.40	0.00	0.00	0.00	0.00	59.40	
ist	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
2010.49.10. COMPLIANCE MONITORING								
2010.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al	5.00 EA	0	25,000	0	0	0	25,000	5000.00
low								

2010.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2010.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00

2010.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2010.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2010.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00

2010.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2010.49.10.25. SAMPLING TECHNICIANS

2010.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00

2010.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2010.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75
2010.55. QC & ANALYTICAL DATA VALIDATION								
2010.55. 5. DATA VALIDATION								
2010.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00

2010.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2010.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
2010.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2010.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2010.60. DEMOBE/DEMO SPH 6PH COMPONENTS									
USR AA Remove/Salvage SPT 6ph			0.00	0.00	0.00	37452.00	0.00	37452.00	
Aboveground Components	1.00	LS	0	0	0	37,452	0	37,452	37452.00
TOTAL DEMOBE/DEMO SPH 6PH COMPONENT	1.00	JOB	0	0	0	37,452	0	37,452	37452.00
TOTAL HEAT YR1 STEP 2	1.00	JOB	1,093,804	67,420	79,261	1,065,939	1,485,840	3,792,264	3792264.09

2011. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011. HEAT YR 2 STEP 2								
2011. 5. GENERAL CONDITIONS								
2011. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2011. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2011.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2011.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2011.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2011.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts/Maintenance		0.00	0.00	600.00	0.00	0.00	600.00	
	12.00 MO	0	0	7,200	0	0	7,200	600.00
USR AA Well Maintenance		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
TOTAL MAINTENANCE	12.00 MO	0	0	17,200	23,000	0	40,200	3350.00

2011.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	233430 MBT	0	0	0	0	817,005	817,005	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	42048 UNT	0	0	0	0	33,638	33,638	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,120,619	1,120,619	93384.95
2011.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2011.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	12090 LB	0	0	12,090	0	0	12,090	1.00

2011.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	3636.00 LB	0	0	5,454	0	0	5,454	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	13453 LB	0	0	2,018	0	0	2,018	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	33451 LB	0	0	1,338	0	0	1,338	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	21816 LB	0	0	2,182	0	0	2,182	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1091.00 LB	0	0	1,942	0	0	1,942	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
TOTAL CHEMICALS	12.00 MO	0	0	30,840	1,500	0	32,340	2694.96

2011.45. DISPOSALS

2011.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	73.00 CY	0	0	0	2,920	0	2,920	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	109.00 TON	0	0	0	6,540	0	6,540	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	9,460	0	12,460	1038.33

2011.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	3636.00 LBS	0	0	0	1,673	0	1,673	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	1,673	0	1,673	139.38
2011.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	12090 LBS	0	0	0	4,836	0	4,836	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	4,836	0	4,836	403.00
2011.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2011.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2011.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2011.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	95,769	0	108,469	9039.05
2011.49. SAMPLING & ANALYSIS								
2011.49. 5. PERFORMANCE MONITORING								
2011.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2011.49.10. COMPLIANCE MONITORING								
2011.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2011.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	22,800	0	54,100	4508.33
2011.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	55.00 EA	0	0	0	7,700	0	7,700	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2011.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2011.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2011.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2011.49.10.25. SAMPLING TECHNICIANS

2011.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2011.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.49.10.25.10. GW MONITORING REPORT									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	160.00	HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	32.00	HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	112,650	8,906	197,348	16445.64
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	118,010	8,906	212,415	17701.25
2011.55. QC & ANALYTICAL DATA VALIDATION									
2011.55. 5. DATA VALIDATION									
2011.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
2011.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00

2011.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
2011.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	23,166	0	0	0	0	23,166	1930.50

2011.60. TREATMENT SYSTEM CONSTRUCTION

2011.60.01. FIELD SUPERVISION & MANAGEMENT

Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.

USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	1400.00 HR	93,541	0	0	0	0	93,541	66.82
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	1400.00 HR	60,858	0	0	0	0	60,858	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	1400.00 HR	74,382	0	0	0	0	74,382	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	1400.00 HR	27,048	0	0	0	0	27,048	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	1400.00 HR	51,842	0	0	0	0	51,842	37.03
USR AA Site QC Officer		43.47	0.00	0.00	0.00	0.00	43.47	
	1400.00 HR	60,858	0	0	0	0	60,858	43.47
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	1400.00 HR	71,664	0	0	0	0	71,664	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	1400.00 HR	0	7,700	0	0	0	7,700	5.50
REF. EP 1110-1-8 4X2 3/4-TON								

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Lodging; Assume three apartme		0.00	0.00	0.00	0.00	1000.00	1000.00	
nts	24.00 MO	0	0	0	0	24,000	24,000	1000.00
for 8 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	1152.00 DAY	0	0	0	0	32,832	32,832	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	60.00 EA	0	0	0	0	30,000	30,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	60.00 EA	0	0	0	0	1,200	1,200	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	30000 MI	0	0	0	0	10,500	10,500	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	440,193	7,700	0	0	98,532	546,425	546424.90

2011.60.02. ADMINISTRATION HOME OFFICE
Scheduler, also serves in cost control. Average 20 hrs/wk.

USR AA Program Manager.		103.40	0.00	0.00	0.00	0.00	103.40	
	244.00 HR	25,230	0	0	0	0	25,230	103.40
USR AA Prin. Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	300.00 HR	27,390	0	0	0	0	27,390	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	488.00 HR	18,788	0	0	0	0	18,788	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	1126.00 HR	66,884	0	0	0	0	66,884	59.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	140.00 HR	14,476	0	0	0	0	14,476	103.40
Health and Safety Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	140.00 HR	14,476	0	0	0	0	14,476	103.40
gr								
USR AA Mileage on Personal Car Pjm		0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 52 wks	14560 MI	0	0	0	0	4,514	4,514	0.31
*								
USR AA Lodging; 1.5 mo for PjM plus		0.00	0.00	0.00	0.00	80.00	80.00	
additional visits during	70.00 DAY	0	0	0	0	5,600	5,600	80.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE			0.00	0.00	0.00	0.00	38.00	38.00	
	70.00	DAY	0	0	0	0	2,660	2,660	38.00
USR AA Airfare Trips for HSM, QCSyst			0.00	0.00	0.00	0.00	500.00	500.00	
ems	4.00	EA	0	0	0	0	2,000	2,000	500.00
Mngr,									
USR AA Rental Car HSM visits (4) and			0.00	0.00	0.00	0.00	45.00	45.00	
2	4.00	DAY	0	0	0	0	180	180	45.00
visits by QC Systems Mgr.									
USR AA Parking/Taxi			0.00	0.00	0.00	0.00	20.00	20.00	
	8.00	EA	0	0	0	0	160	160	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00	JOB	167,244	0	0	0	15,114	182,358	182357.60
2011.60.03. PURCHASING									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	1000.00	HR	72,600	0	0	0	0	72,600	72.60
USR AA Secretary/Clerical IV Home			38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	100.00	HR	3,850	0	0	0	0	3,850	38.50
TOTAL PURCHASING	1.00	JOB	76,450	0	0	0	0	76,450	76450.00
2011.60.05. TREATMENT SYSTEM EQUIP. F&I									
2011.60.05. 5. EXPEDITOR/QC EQUIP. FABRICATION									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
-	200.00	HR	14,520	0	0	0	0	14,520	72.60
Starup/Proveout Project Manager									
USR AA Per Diem/M&IE			0.00	0.00	0.00	0.00	150.00	150.00	
	20.00	DAY	0	0	0	0	3,000	3,000	150.00
USR AA Airfare Trips			0.00	0.00	0.00	0.00	500.00	500.00	
	4.00	EA	0	0	0	0	2,000	2,000	500.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	20.00	DAY	0	0	0	0	900	900	45.00
USR AA Taxi/Limo			0.00	0.00	0.00	0.00	20.00	20.00	
	4.00	EA	0	0	0	0	80	80	20.00
TOTAL EXPEDITOR/QC EQUIP. FABRICATI	1.00	JOB	14,520	0	0	0	5,980	20,500	20500.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.60.05.01. EQUIP SUBMITTAL REVIEW									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	100.00	HR	10,340	0	0	0	0	10,340	103.40
ana									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	600.00	HR	35,640	0	0	0	0	35,640	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	40.00	HR	1,540	0	0	0	0	1,540	38.50
USR AA Blueprints			0.00	0.00	0.00	3.00	0.00	3.00	
	500.00	EA	0	0	0	1,500	0	1,500	3.00
USR AA Mail			0.00	0.00	0.00	12.00	0.00	12.00	
	50.00	EA	0	0	0	600	0	600	12.00
TOTAL EQUIP SUBMITTAL REVIEW	1.00	JOB	47,520	0	0	2,100	0	49,620	49620.00
2011.60.05.10. EQUIPMENT PURCHASE/SHIPPING									
USR AA Steam Boiler			0.00	0.00	140000.00	0.00	0.00	140000.00	
	1.00	LS	0	0	140,000	0	0	140,000	140000.00
USR AA CEMS System for Boiler Stack			0.00	0.00	75000.00	0.00	0.00	75000.00	
	1.00	EA	0	0	75,000	0	0	75,000	75000.00
USR AA Heat Exchanger Condensor			0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00	LS	0	0	10,000	0	0	10,000	10000.00
USR AA Liquid/Vapor Separator			0.00	0.00	4000.00	0.00	0.00	4000.00	
	1.00	LS	0	0	4,000	0	0	4,000	4000.00
USR AA Vacuum Pump			0.00	0.00	70000.00	0.00	0.00	70000.00	
piping skid; butterfly valves; flexible piping; camlock connections complete.	1.00	LS	0	0	70,000	0	0	70,000	70000.00
USR AA Liquid Separator			0.00	0.00	8000.00	0.00	0.00	8000.00	
	1.00	LS	0	0	8,000	0	0	8,000	8000.00
USR AA Air Dryer			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Freight			0.00	0.00	40000.00	0.00	0.00	40000.00	
	1.00	LS	0	0	40,000	0	0	40,000	40000.00
USR AA Heat Exchanger, Liquids from			0.00	0.00	15000.00	0.00	0.00	15000.00	
Extraction Wells	1.00	EA	0	0	15,000	0	0	15,000	15000.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Liquid Cooling Tower		0.00	0.00	15000.00	0.00	0.00	15000.00	
	1.00 LS	0	0	15,000	0	0	15,000	15000.00
USR AA pH Adjust System		0.00	0.00	6000.00	0.00	0.00	6000.00	
	1.00 LS	0	0	6,000	0	0	6,000	6000.00
USR AA Coelescing Separator		0.00	0.00	80000.00	0.00	0.00	80000.00	
	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA IAF Separator		0.00	0.00	80000.00	0.00	0.00	80000.00	
	1.00 LS	0	0	80,000	0	0	80,000	80000.00
USR AA Steam Regenerated Carbon Syst		0.00	0.00	80000.00	0.00	0.00	80000.00	
em	1.00 LS	0	0	80,000	0	0	80,000	80000.00
(Vapor Ph)								
USR AA Carbon Polishing Vessels (Vap		0.00	0.00	6000.00	0.00	0.00	6000.00	
or	1.00 LS	0	0	6,000	0	0	6,000	6000.00
Phase)								
USR AA Multi Media Vessels		0.00	0.00	10000.00	0.00	0.00	10000.00	
	2.00 LS	0	0	20,000	0	0	20,000	10000.00
USR AA Steam Regenerated GAC System		0.00	0.00	10000.00	0.00	0.00	10000.00	
(Liquid Phase)	2.00 LS	0	0	20,000	0	0	20,000	10000.00
USR AA 300 SCFM Air Compressor with		0.00	0.00	25000.00	0.00	0.00	25000.00	
Dryer	1.00 LS	0	0	25,000	0	0	25,000	25000.00
USR AA Misc. Pumps, Valves, Fittings		0.00	0.00	60000.00	0.00	0.00	60000.00	
,	1.00 LS	0	0	60,000	0	0	60,000	60000.00
Conveyance Pipe & Instruments								
USR AA Spare Parts		0.00	0.00	70000.00	0.00	0.00	70000.00	
	1.00 LS	0	0	70,000	0	0	70,000	70000.00
USR AA Tool Box and Tools		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Initital Chemical Supply		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
TOTAL EQUIPMENT PURCHASE/SHIPPING	1.00 JOB	0	0	856,000	0	0	856,000	856000.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.60.05.12. INSTRUMENTATION/CONTROLLERS									
USR AA I/O and Cabinet			0.00	0.00	17000.00	0.00	0.00	17000.00	
	1.00	LS	0	0	17,000	0	0	17,000	17000.00
USR AA Software and Processors			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	LS	0	0	20,000	0	0	20,000	20000.00
USR AA Autodailer			0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00	LS	0	0	1,000	0	0	1,000	1000.00
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	480.00	HR	43,824	0	0	0	0	43,824	91.30
Instrument Engineer									
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Electrical Designer	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
Instrument Designer	500.00	HR	36,300	0	0	0	0	36,300	72.60
TOTAL INSTRUMENTATION/CONTROLLERS	1.00	JOB	83,028	0	38,000	0	0	121,028	121028.00
2011.60.05.15. EQUIPMENT INSTALLATION									
USR AA Crane Rental			0.00	0.00	0.00	4000.00	0.00	4000.00	
	2.00	WK	0	0	0	8,000	0	8,000	4000.00
USR AA Materials/Grout/Misc			0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00	JOB	0	0	20,000	0	0	20,000	20000.00
MIL AA Eq Oper, Medium			56.51	0.00	0.00	0.00	0.00	56.51	
	160.00	HR	9,041	0	0	0	0	9,041	56.51
MIL AA Laborer (Semi-Skilled)			38.39	0.00	0.00	0.00	0.00	38.39	
	480.00	HR	18,427	0	0	0	0	18,427	38.39
UPB AA FORK LIFT,R/T 8,000#,16.00'L			0.00	11.94	0.00	0.00	0.00	11.94	
-HT	160.00	HR	0	1,911	0	0	0	1,911	11.94
TOTAL EQUIPMENT INSTALLATION	1.00	JOB	27,468	1,911	20,000	8,000	0	57,378	57378.48
TOTAL TREATMENT SYSTEM EQUIP. F&I	1.00	JOB	172,536	1,911	914,000	10,100	5,980	1,104,526	1104526.48

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2011.60.06. FIRST AID, FIRE, TRAFFIC, SECUR								
USR AA Security Guard Service 24 hr/		0.00	0.00	0.00	15.00	0.00	15.00	
day	8760.00 HR	0	0	0	131,400	0	131,400	15.00
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S		56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00 EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower		145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	1.00 EA	145	1	123	0	0	269	269.19
HTW AA Eye Wash Bowl		126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No Additional Copper Piping Etc.	4.00 EA	508	4	661	0	0	1,173	293.21
HTW AA First Aid Kit		0.00	0.00	75.00	0.00	0.00	75.00	
	16.00 EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher		0.00	0.00	150.00	0.00	0.00	150.00	
	2.00 EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00 JOB	1,773	15	3,458	131,400	0	136,647	136646.78
2011.60.07. HEALTH & SAFETY								
USR AA Decon Misc Items		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
USR AA Level C PPE		0.00	0.00	41.00	0.00	0.00	41.00	
	40.00 DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE		0.00	0.00	12.00	0.00	0.00	12.00	
	100.00 DAY	0	0	1,200	0	0	1,200	12.00
USR AA Install/Decon Personnel Decon		192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00 LS	192	1	250	0	0	443	443.30
USR AA Photo Ionization Detector		0.00	800.00	0.00	0.00	0.00	800.00	
	8.00 MO	0	6,400	0	0	0	6,400	800.00
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	8.00 MO	0	2,800	0	0	0	2,800	350.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	8.00 MO	0	3,400	0	0	0	3,400	425.00
USR AA Labor Allowance for Site Specific Training		120.00	0.00	0.00	0.00	0.00	120.00	
	40.00 EA	4,800	0	0	0	0	4,800	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	40.00 EA	8,000	0	0	0	0	8,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	40.00 EA	0	0	0	14,000	0	14,000	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	12,992	12,601	4,140	14,000	0	43,733	43733.30
2011.60.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	8.00 MO	0	0	0	0	600	600	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	8.00 MO	0	0	0	0	1,600	1,600	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	8.00 MO	0	0	0	0	3,200	3,200	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	8.00 MO	0	0	0	0	1,600	1,600	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	16.00 MO	0	0	0	0	1,360	1,360	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	8.00 MO	0	0	3,200	0	0	3,200	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	8.00 MO	0	0	0	1,600	0	1,600	200.00
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	8.00 MO	0	4,800	0	0	0	4,800	600.00
USR AA COE Office Trailer		0.00	500.00	0.00	0.00	0.00	500.00	
	8.00 MO	0	4,000	0	0	0	4,000	500.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 MO	0	800	0	0	0	800	100.00

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	8.00 MO	0	0	0	0	400	400	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	6.00 EA	0	18,000	0	0	0	18,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	2.00 EA	0	4,000	0	0	0	4,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	8.00 EA	0	800	0	0	0	800	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	3.00 EA	0	0	0	1,800	0	1,800	600.00
USR AA Small Tool Allowance		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA COE Office Computer		0.00	0.00	2700.00	0.00	0.00	2700.00	
	1.00 EA	0	0	2,700	0	0	2,700	2700.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	8.00 MO	0	0	0	1,600	0	1,600	200.00
USR AA COE Software, Primavera		0.00	0.00	500.00	0.00	0.00	500.00	
Suretrack	1.00 EA	0	0	500	0	0	500	500.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 EA	0	0	0	10,000	0	10,000	10000.00
USR AA Temp Water Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 EA	0	0	0	5,000	0	5,000	5000.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	5000.00	0.00	5000.00	
	2.00 EA	0	0	0	10,000	0	10,000	5000.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	32,400	16,700	30,000	8,760	87,860	87860.00
2011.60.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	500.00	500.00	
	8.00 MO	0	0	0	0	4,000	4,000	500.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	8.00 MO	0	0	0	0	3,600	3,600	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	8.00 MO	0	0	0	800	1	801	100.10

2011.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL PROJECT UTILITIES	1.00	JOB	0	0	0	800	7,601	8,401	8400.80
TOTAL TREATMENT SYSTEM CONSTRUCTION			871,189	54,627	938,298	186,300	135,986	2,186,400	
TOTAL HEAT YR 2 STEP 2	1.00	JOB	1,961,121	118,687	1,017,408	486,259	1,270,270	4,853,744	4853743.94

2012. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012. HEAT YR 3 STEP 2 & WELLS STEP 3								
2012. 5. GENERAL CONDITIONS								
2012. 5.01. FIELD SUPERVISION & MANAGEMENT								
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	692.00 HR	30,081	0	0	0	0	30,081	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	692.00 HR	36,766	0	0	0	0	36,766	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	692.00 HR	13,369	0	0	0	0	13,369	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	692.00 HR	25,625	0	0	0	0	25,625	37.03
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	692.00 HR	35,422	0	0	0	0	35,422	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	692.00 HR	0	3,806	0	0	0	3,806	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume two apartment		0.00	0.00	0.00	0.00	1000.00	1000.00	
s	6.00 MO	0	0	0	0	6,000	6,000	1000.00
for 3 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	180.00 DAY	0	0	0	0	5,130	5,130	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	2.00 EA	0	0	0	0	1,000	1,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	2.00 EA	0	0	0	0	40	40	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	2000.00 MI	0	0	0	0	700	700	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	141,264	3,806	0	0	12,870	157,940	157939.84
2012. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60

2012. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73

2012. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GENERAL CONDITIONS	12.00 MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2012.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67
2012.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00

2012.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2012.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2012.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts/Maintenance		0.00	0.00	600.00	0.00	0.00	600.00	
	12.00 MO	0	0	7,200	0	0	7,200	600.00
USR AA Well Maintenance		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
TOTAL MAINTENANCE	12.00 MO	0	0	17,200	23,000	0	40,200	3350.00

2012.30. UTILITIES

Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.

Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.

Makeup water requirements.
Costed at 0.80/750 gallon unit per local utilit

USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00

2012.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	233430 MBT	0	0	0	0	817,005	817,005	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	4380.00 KKW	0	0	0	0	262,800	262,800	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	42048 UNT	0	0	0	0	33,638	33,638	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,120,619	1,120,619	93384.95
2012.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2012.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	12090 LB	0	0	12,090	0	0	12,090	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	3636.00 LB	0	0	5,454	0	0	5,454	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	13453 LB	0	0	2,018	0	0	2,018	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	33451 LB	0	0	1,338	0	0	1,338	0.04

2012.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	21816 LB	0	0	2,182	0	0	2,182	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1091.00 LB	0	0	1,942	0	0	1,942	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	1454.00 LB	0	0	2,908	0	0	2,908	2.00
TOTAL CHEMICALS	12.00 MO	0	0	30,840	1,500	0	32,340	2694.96

2012.45. DISPOSALS

2012.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	73.00 CY	0	0	0	2,920	0	2,920	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	109.00 TON	0	0	0	6,540	0	6,540	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	9,460	0	12,460	1038.33

2012.45.10. CARBON (GAC, VAPOR PHASE)
Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.

USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	3636.00 LBS	0	0	0	1,673	0	1,673	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	1,673	0	1,673	139.38

2012.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	12090 LBS	0	0	0	4,836	0	4,836	0.40

2012.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	4,836	0	4,836	403.00
2012.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2012.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2012.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g		0.00	0.00	0.00	500.00	0.00	500.00	
Loadouts & Waste Handling	2.00 EA	0	0	0	1,000	0	1,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	95,769	0	108,469	9039.05

2012.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.49. SAMPLING & ANALYSIS									
2012.49. 5. PERFORMANCE MONITORING									
2012.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment			0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00	EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs			0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00	EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic			0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00	EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)			0.00	0.00	0.00	55.00	0.00	55.00	
	58.00	EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
2012.49.10. COMPLIANCE MONITORING									
2012.49.10. 5. FUGITIVE EMISSIONS									
USR AA Air Monitoring Stations,			0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00	EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site			0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00	EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses			0.00	0.00	200.00	0.00	0.00	200.00	
	1.00	LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags			0.00	0.00	200.00	0.00	0.00	200.00	
	12.00	MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)			0.00	0.00	0.00	220.00	0.00	220.00	
	40.00	EA	0	0	0	8,800	0	8,800	220.00

2012.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2012.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	55.00 EA	0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2012.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280		0.00	0.00	950.00	0.00	0.00	950.00	
)	5.00 EA	0	0	4,750	0	0	4,750	950.00

2012.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2012.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00

2012.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2012.49.10.25. SAMPLING TECHNICIANS

2012.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2012.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

2012.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2012.55. QC & ANALYTICAL DATA VALIDATION									
2012.55. 5. DATA VALIDATION									
2012.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
2012.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
2012.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50

2012.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50

2012.60. TREATMENT SYSTEM CONSTRUCTION

2012.60.10. INSTALL WELLS

2012.60.10. 5. EXTRACTION WELLS THERMAL
Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,

2012.60.10. 5.16. "B" ZONE WELLS

USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	7790.00	LFT	0	0	0	1,051,650	0	1,051,650	135.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	1,051,650	0	1,051,650	1051650.00

2012.60.10. 5.30. EXTRACTION PUMPS

USR AA Extraction Pumps Incl Controllers	82.00	EA	0.00 0	0.00 0	2500.00 205,000	0.00 0	0.00 0	2500.00 205,000	2500.00
USR AA 300 SCFM Compressor to run pumps	1.00	EA	0.00 0	0.00 0	25000.00 25,000	0.00 0	0.00 0	25000.00 25,000	25000.00
USR AA Discharge Tubing Pump to Wellhead; SS	10055	LFT	0.00 0	0.00 0	11.00 110,605	0.00 0	0.00 0	11.00 110,605	11.00
USR AA Air Supply Tubing Wellhead to Pumps	10055	LFT	0.00 0	0.00 0	6.00 60,330	0.00 0	0.00 0	6.00 60,330	6.00
USR AA Pulse Counters w/ 4-20 ma Signal	82.00	EA	0.00 0	0.00 0	395.00 32,390	0.00 0	0.00 0	395.00 32,390	395.00
USR AA Downwell Liquid Level Bubbler Tube	10000	LFT	0.00 0	0.00 0	2.00 20,000	0.00 0	0.00 0	2.00 20,000	2.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Spare Parts; Initial Supply f		0.00	0.00	500.00	0.00	0.00	500.00	
or	1.00 LS	0	0	500	0	0	500	500.00
Pumps								
USR AA Connection Fittings; Air &		0.00	0.00	200.00	0.00	0.00	200.00	
Discharg Tubing/Manifolds, Et	82.00 EA	0	0	16,400	0	0	16,400	200.00
c.								
TOTAL EXTRACTION PUMPS	82.00 EA	0	0	470,225	0	0	470,225	5734.45
2012.60.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps		0.00	0.00	0.00	725.00	0.00	725.00	
	82.00 EA	0	0	0	59,450	0	59,450	725.00
USR AA Install Down-hole Instruments		0.00	0.00	0.00	450.00	0.00	450.00	
	82.00 EA	0	0	0	36,900	0	36,900	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	82.00 EA	0	0	0	96,350	0	96,350	1175.00
2012.60.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS		0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	82.00 EA	0	0	0	20,500	0	20,500	250.00
TOTAL WELL TOP COMPLETION	82.00 EA	0	0	0	20,500	0	20,500	250.00
2012.60.10. 5.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	82.00 EA	0	0	0	82,000	0	82,000	1000.00
TOTAL WELL DEVELOPMENT	82.00 EA	0	0	0	82,000	0	82,000	1000.00
TOTAL EXTRACTION WELLS THERMAL	1.00 JOB	0	0	470,225	1,250,500	0	1,720,725	1720725.00

2012.60.10.10. STEAM INJECTION WELLS
Injection well pricing includes development, handling of cuttings and liquid wastes,

2012.60.10.10.10. "B" ZONE WELLS

USR AA Injection Wells		0.00	0.00	0.00	135.00	0.00	135.00	
	1235.00 LFT	0	0	0	166,725	0	166,725	135.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	166,725	0	166,725	166725.00
2012.60.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	13.00	EA	0	0	0	21,125	0	21,125	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	21,125	0	21,125	21125.00
2012.60.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS			0.00	0.00	0.00	250.00	0.00	250.00	
Flange on 6" Pipe	13.00	EA	0	0	0	3,250	0	3,250	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	3,250	0	3,250	3250.00
2012.60.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	13.00	EA	0	0	0	13,000	0	13,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	13,000	0	13,000	13000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	204,100	0	204,100	204100.00
2012.60.10.20. MONITORING WELLS									
2012.60.10.20. 5. INSTALL WELLS									
USR AA Install 4" Monitoring Wells,			0.00	0.00	0.00	100.00	0.00	100.00	
SS	2002.00	LFT	0	0	0	200,200	0	200,200	100.00
Casing and Screens									
TOTAL INSTALL WELLS	4.00	EA	0	0	0	200,200	0	200,200	50050.00
2012.60.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT									
M AIR AA Lo Flo Pump & Teflon Tubing			0.00	0.00	550.00	0.00	0.00	550.00	
	14.00	EA	0	0	7,700	0	0	7,700	550.00
USR AA Misc Tools & Sampling Equipme			0.00	0.00	1000.00	0.00	0.00	1000.00	
nt	1.00	EA	0	0	1,000	0	0	1,000	1000.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Install Lo-Flo Pumps and			0.00	0.00	0.00	100.00	0.00	100.00	
Discharge/Sampling System	14.00	EA	0	0	0	1,400	0	1,400	100.00
USR AA Sample Pump Tubing, Teflon Li			0.00	0.00	3.50	0.00	0.00	3.50	
ned	600.00	LFT	0	0	2,100	0	0	2,100	3.50
USR AA Slip On Well Cap Assbly			0.00	0.00	65.00	0.00	0.00	65.00	
	14.00	EA	0	0	910	0	0	910	65.00
USR AA Flexible Discharge Tubing			0.00	0.00	23.00	0.00	0.00	23.00	
Adaptor	14.00	EA	0	0	322	0	0	322	23.00
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	12,032	1,400	0	13,432	13432.00
2012.60.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole			0.00	0.00	0.00	1625.00	0.00	1625.00	
Instruments	28.00	EA	0	0	0	45,500	0	45,500	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	45,500	0	45,500	45500.00
2012.60.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pi			0.00	0.00	0.00	250.00	0.00	250.00	
pe	14.00	EA	0	0	0	3,500	0	3,500	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	3,500	0	3,500	3500.00
2012.60.10.20.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	14.00	EA	0	0	0	14,000	0	14,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	14,000	0	14,000	14000.00
TOTAL MONITORING WELLS	1.00	JOB	0	0	12,032	264,600	0	276,632	276632.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.60.10.25. TREAT WELL DRILL LIQUIDS/CUTTING								
During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.								
The liquids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.								
USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	48.00 EA	0	0	0	19,200	0	19,200	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	20.00 MO	0	20,000	0	0	0	20,000	1000.00
USR AA Treat Contaminated Water		0.00	0.00	0.00	0.25	0.00	0.25	
w/Portable On-site Treatment Plant	199305 GAL	0	0	0	49,826	0	49,826	0.25
USR AA Onsite Steam Strip Drill		1.80	0.03	0.00	0.00	55.00	56.83	
Cuttings	1025.00 TON	1,845	32	0	0	56,375	58,252	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.20 MGL	0	0	0	17,720	0	17,720	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.20 MGL	0	0	0	2,879	0	2,879	14465.00
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.06 KLB	0	0	0	2,168	0	2,168	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.09 KLB	0	0	0	1,492	0	1,492	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	1,845	20,032	0	93,492	56,375	171,744	171743.81
2012.60.10.30. ANALYTICALS SOILS								
Well installation soil samples - initial baseline.								
M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83 10)	22.00	EA	0	0	0	3,542	0	3,542	161.00
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	180.00	0.00	180.00	
70)	22.00	EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00	JOB	0	0	0	9,416	0	9,416	9416.00

2012.60.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic			0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	66.00	EA	0	0	0	9,240	0	9,240	140.00
M AIR AA PCP/Semivolatile Organics (82			0.00	0.00	0.00	155.00	0.00	155.00	
70)	66.00	EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)			0.00	0.00	0.00	40.00	0.00	40.00	
	66.00	EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600			0.00	0.00	0.00	55.00	0.00	55.00	
	66.00	EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290			0.00	0.00	0.00	950.00	0.00	950.00	
)	11.00	EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00	JOB	0	0	0	36,190	0	36,190	36190.00

2012.60.10.40. LABOR & ODC's
Geologist to work with drillers for soil visual inspection/classification & sampling.
Sampling team and equipment to sample wells as well development is completed.

USR AA Engineer/Scientist IV, Geolog			59.40	0.00	0.00	0.00	0.00	59.40	
ist	160.00	HR	9,504	0	0	0	0	9,504	59.40
USR AA Engineer/Scientist IV, Sampli			59.40	0.00	0.00	0.00	0.00	59.40	
ng	40.00	HR	2,376	0	0	0	0	2,376	59.40
Lead									

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	40.00 HR	2,684	0	0	0	0	2,684	67.10
USR AA Technician/Analyst IV, Sampli		33.00	0.00	0.00	0.00	0.00	33.00	
ng	80.00 HR	2,640	0	0	0	0	2,640	33.00
Tech								
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	16.00 HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	8.00 HR	387	0	0	0	0	387	48.40
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	10.00 DAY	0	0	0	0	1,980	1,980	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	10.00 DAY	0	0	0	0	420	420	42.00
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	10.00 EA	0	0	0	0	500	500	50.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	4.00 EA	0	0	0	0	48	48	12.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	1.00 EA	0	0	0	50	0	50	50.00
USR AA Hose		0.00	0.00	2.50	0.00	0.00	2.50	
	400.00 LFT	0	0	1,000	0	0	1,000	2.50
USR AA Misc Sampling		0.00	0.00	400.00	0.00	0.00	400.00	
Equipment/Materials	1.00 LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00 JOB	19,061	0	1,400	50	3,134	23,645	23644.80
TOTAL INSTALL WELLS	1.00 JOB	20,906	20,032	483,657	1,858,348	59,509	2,442,452	2442451.61

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.60.15. PIPING								
2012.60.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	1560.00 LF	11,891	278	9,451	0	0	21,619	13.86
L MIL PL 8"(20cm) Black Pipe,PE Sch40		9.62	0.52	8.92	0.00	0.00	19.06	
A53	1560.00 LF	19,271	1,037	17,859	0	0	38,168	24.47
L MIL PL 6"(15cm) Black Pipe,PE Sch40		5.94	0.14	7.18	0.00	0.00	13.26	
A53	520.00 LF	3,964	93	4,796	0	0	8,852	17.02
MIL PL 8" 90 Degree LR Weld Ell, Std		360.80	19.42	125.85	0.00	0.00	506.07	
Wt	5.00 EA	2,316	125	808	0	0	3,249	649.78
MIL PL 6" 90 Degree LR Weld Ell, Std		274.51	6.42	67.81	0.00	0.00	348.74	
Wt	5.00 EA	1,762	41	435	0	0	2,239	447.78
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	676.00 LF	6,870	161	2,838	0	0	9,868	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	198.00 EA	42,286	989	7,010	0	0	50,285	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	65.00 EA	2,642	62	225	0	0	2,929	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	130.00 EA	9,909	232	4,290	0	0	14,430	111.00
AIR AA Slip On Flange 6"		158.30	3.70	40.70	0.00	0.00	202.71	
	5.00 EA	792	19	204	0	0	1,014	202.71
MIL PL 8" Weld Neck Flange, 150#		156.02	8.40	100.07	0.00	0.00	264.49	
	5.00 EA	1,002	54	642	0	0	1,698	339.59
MIL PL 4" x 3" Reducer, Eccentric		166.64	3.90	26.44	0.00	0.00	196.98	
	130.00 EA	27,814	651	4,414	0	0	32,879	252.91
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	2.00 EA	214	5	30	0	0	248	124.24

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	386.00 EA	49,552	472	3,733	0	0	53,757	139.27
MIL PL 6"(8@3/4Dx3-1/4"Lg) B N & G'S		118.73	1.13	11.91	0.00	0.00	131.77	
ets	5.00 EA	762	7	76	0	0	846	169.18
MIL PL 8"(8@3/4Dx3-1/4"Lg) B N & G'S		118.73	1.13	13.30	0.00	0.00	133.16	
ets	5.00 EA	762	7	85	0	0	855	170.97
USR PL Pipe Supports		59.36	1.39	200.00	0.00	0.00	260.75	
	250.00 EA	19,055	446	64,199	0	0	83,700	334.80
MIL PL 8"Iron Body,Brz Mtd,Flg,Gate		256.52	2.59	608.12	0.00	0.00	867.23	
Vlv	1.00 EA	329	3	781	0	0	1,113	1113.50
125 #								
M MIL PL 6"Iron Body,Brz Mtd,Flg,Gate		224.45	2.27	365.63	0.00	0.00	592.35	
Vlv	1.00 EA	288	3	469	0	0	761	760.56
125 #								
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate		114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	130.00 EA	19,141	176	37,164	0	0	56,480	434.46
125 #								
USR PL Fit/Cut/Weld 4" pipe to 6" or		237.46	5.55	0.00	0.00	0.00	243.01	
8"	65.00 EA	19,818	463	0	0	0	20,281	312.02
(No Tees required)								
B MIL PL 8"D Pipe, .5" Thk Fbgs Pipe		3.91	0.03	2.50	0.00	0.00	6.43	
Cover w/Fire Retardant Jacket	1560.00 LF	7,823	53	5,008	0	0	12,884	8.26
s								
B MIL PL 6"D Pipe, .5"Thk Fbgs Pipe Cv		3.91	0.03	1.00	0.00	0.00	4.93	
r	520.00 LF	2,608	18	668	0	0	3,293	6.33
w/Fire Retardant Jackets								
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co		7.81	0.05	1.00	0.00	0.00	8.86	
ver	1560.00 LF	15,645	107	2,003	0	0	17,755	11.38
w/Fire Retardant Jackets								
L MIL PL 0.006" Alum Insul Jacket w/Ba		6.25	0.04	0.16	0.00	0.00	6.45	
nds	2200.00 SF	17,651	121	445	0	0	18,216	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00 JOB	284,168	5,621	167,632	0	0	457,421	457421.08

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.60.15.10. LIQUID RECOVERY SYSTEM								
AIR PL Pipe, Iron, Threaded, Sch 80		7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	1560.00 LF	15,313	140	12,419	0	0	27,872	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	2600.00 LF	26,424	618	10,914	0	0	37,956	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std		96.23	2.25	16.68	0.00	0.00	115.16	
Wt	10.00 EA	1,236	29	214	0	0	1,479	147.86
MIL PL 3"Tee,Full Size Butt Weld Std		143.91	3.37	36.78	0.00	0.00	184.06	
Wt	10.00 EA	1,848	43	472	0	0	2,363	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	193.00 EA	7,846	184	669	0	0	8,698	45.07
AIR PL Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	387.00 EA	39,330	920	10,037	0	0	50,288	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	258.00 EA	15,732	150	1,290	0	0	17,172	66.56
M MIL PL 3" Bronze 125# Gate Valve		70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	5.00 EA	453	4	613	0	0	1,070	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc		23.09	0.19	25.86	0.00	0.00	49.14	
rd	65.00 EA	1,927	16	2,158	0	0	4,101	63.09
Lubricated,Wrench Oper w/Wrench								
M MIL PL 2" Single Disc Type Check Val		37.62	0.33	72.27	0.00	0.00	110.23	
ve	65.00 EA	3,140	28	6,032	0	0	9,199	141.53
IB Wafer Type- 125#								
M MIL PL 2" Bronze 125# Gate Valve		46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	130.00 EA	7,707	65	5,288	0	0	13,059	100.46
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover		4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	1560.00 LF	9,005	61	1,992	0	0	11,058	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	2600.00 LF	15,864	108	4,121	0	0	20,093	7.73
w/Fire Retardant Jackets								

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
L MIL PL 0.006" Alum Insul Jacket w/Ba		7.81	0.05	0.16	0.00	0.00	8.02	
nds	1144.00 SF	11,473	78	231	0	0	11,783	10.30
USR AA Flexible Hose; SS; 5' long; 2		14.84	0.35	150.00	0.00	0.00	165.19	
"	65.00 EA	965	23	9,750	0	0	10,737	165.19
dia.								
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	162,208	2,503	66,199	0	0	230,910	230909.92

2012.60.15.11. EXTRACTION WELLHEAD SPOOL/FTG
Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho		474.91	11.11	350.00	0.00	0.00	836.02	
p	82.00 EA	38,943	911	28,700	0	0	68,553	836.02
Fabricated)								
USR AA Connection Fittings; Air &		118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La	82.00 EA	9,736	228	0	0	0	9,963	121.50
bor								
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00 JOB	48,678	1,138	28,700	0	0	78,517	78516.79

2012.60.15.15. STEAM INJECTION SYSTEM

2012.60.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40		8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	1200.00 LF	13,833	140	10,418	0	0	24,391	20.33
MIL PL 4" 90 Degree Ell,150# MI Blac		52.37	0.53	50.23	0.00	0.00	103.13	
k	12.00 EA	807	8	774	0	0	1,589	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	40.00 EA	1,626	38	139	0	0	1,803	45.07
MIL PL 4" Tee, Red Out Butt Weld Std		249.95	5.85	51.39	0.00	0.00	307.19	
Wt	40.00 EA	12,837	300	2,640	0	0	15,777	394.43
AIR AA Slip On Flange 4"		105.54	2.47	25.70	0.00	0.00	133.70	
	41.00 EA	4,327	101	1,054	0	0	5,482	133.70

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	41.00 EA	5,263	50	397	0	0	5,710	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En		306.39	2.92	244.12	0.00	0.00	553.44	
ds	5.00 EA	1,967	19	1,567	0	0	3,553	710.60
Bellows w/Int Sleeves&Ext Covers								
MIL PL Pipe Support		76.64	1.58	27.24	0.00	0.00	105.46	
	120.00 EA	11,809	243	4,196	0	0	16,248	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th		33.86	0.28	43.73	0.00	0.00	77.87	
rd	5.00 EA	217	2	281	0	0	500	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov		5.10	0.03	1.59	0.00	0.00	6.73	
er	1200.00 LF	7,860	54	2,456	0	0	10,370	8.64
w/Fire Retardant Jackets								
MIL PL 0.006" Alum Insul Jacket w/Ba		8.93	0.06	0.16	0.00	0.00	9.15	
nds	600.00 SF	6,877	47	121	0	0	7,045	11.74
		---	---	---	---	---	---	
TOTAL MAIN HEADER PIPING	1.00 JOB	67,424	1,002	24,043	0	0	92,468	92467.85
2012.60.15.15.10. LATERAL PIPING								
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	800.00 LF	8,130	190	3,358	0	0	11,679	14.60
AIR AA Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	318.00 EA	25,170	589	6,424	0	0	32,183	101.20
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	396.00 EA	24,147	230	1,980	0	0	26,357	66.56
MIL PL 3" Tee, Red Out Butt Weld Std		143.91	3.37	36.94	0.00	0.00	184.22	
Wt	5.00 EA	924	22	237	0	0	1,183	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En		263.84	2.51	209.44	0.00	0.00	475.79	
ds	40.00 EA	13,551	129	10,757	0	0	24,436	610.90
Bellows w/Int Sleeves&Ext Covers								
MIL PL 3" OD Snap-On Plastic Valve T		19.53	0.16	6.00	0.00	0.00	25.70	
ag	160.00 EA	4,013	34	1,232	0	0	5,279	32.99
Includes Insulation								

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL NDT, X-Ray Welds of 3" Dia Pi		50.79	0.45	30.00	0.00	0.00	81.24	
pe	20.00 EA	1,304	12	770	0	0	2,086	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	5.00 EA	9,869	88	0	0	0	9,956	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	800.00 LF	4,881	33	1,268	0	0	6,182	7.73
w/Fire Retardant Jackets								
M MIL PL 3" Pipe Support		57.13	1.18	20.00	0.00	0.00	78.31	
	40.00 EA	2,934	60	1,027	0	0	4,022	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di		61.16	0.56	56.88	0.00	0.00	118.60	
sc	80.00 EA	6,282	58	5,843	0	0	12,182	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer								
M MIL PL 3" Flg St Press Regul&Reducer		128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	40.00 EA	6,592	154	100,861	0	0	107,608	2690.19
Sgl Seat,Sprg Load Dir Act Diap								
M MIL PL 3" Twin Disc Type Check Valve		45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	40.00 EA	2,312	22	3,279	0	0	5,613	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T		25.39	0.21	18.68	0.00	0.00	44.29	
hrd	40.00 EA	1,304	11	959	0	0	2,275	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	240.00 EA	9,756	228	832	0	0	10,816	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th		33.86	0.28	43.73	0.00	0.00	77.87	
rd	80.00 EA	3,478	29	4,492	0	0	7,999	99.99
TOTAL LATERAL PIPING	1.00 JOB	128,595	1,924	143,320	0	0	273,838	273838.47

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.60.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	13.00	EA	3,087	72	6,500	0	0	9,659	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	3,087	72	6,500	0	0	9,659	9659.11
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	199,106	2,997	173,862	0	0	375,965	375965.44
TOTAL PIPING	1.00	JOB	694,160	12,260	436,393	0	0	1,142,813	1142813.23
2012.60.30. TREATMENT SYSTEM EQUIPMENT									
2012.60.30.13. COMPUTER									
USR AA Computer			0.00	0.00	3000.00	0.00	0.00	3000.00	
	1.00	EA	0	0	3,000	0	0	3,000	3000.00
USR AA Maintenance Software			0.00	0.00	2300.00	0.00	0.00	2300.00	
	1.00	EA	0	0	2,300	0	0	2,300	2300.00
USR AA Software Maintenance Support Plan	1.00	YR	0.00 0	0.00 0	0.00 0	450.00 450	0.00 0	450.00 450	450.00
USR AA Software Training			0.00	0.00	0.00	4000.00	0.00	4000.00	
	1.00	LS	0	0	0	4,000	0	4,000	4000.00
USR AA Senior Engineer/Scientist II; O&M Project Manager	40.00	HR	72.60 2,904	0.00 0	0.00 0	0.00 0	0.00 0	72.60 2,904	72.60
USR AA Senior Engineer/Scientist III			79.20	0.00	0.00	0.00	0.00	79.20	
	40.00	HR	3,168	0	0	0	0	3,168	79.20
TOTAL COMPUTER	1.00	JOB	6,072	0	5,300	4,450	0	15,822	15822.00
2012.60.30.16. TREATMENT SYSTEM ELECTRICAL & IN									
USR AA Electrical/Instrumentation Allowance	1.00	LS	0.00 0	0.00 0	175000.00 175,000	0.00 0	0.00 0	175000.00 175,000	175000.00
TOTAL TREATMENT SYSTEM ELECTRICAL &	1.00	JOB	0	0	175,000	0	0	175,000	175000.00
2012.60.30.17. MECHANICAL									
USR AA Mechanical Subcontractor Piping GW Treatment/Steam Systems	1.00	JOB	0.00 0	0.00 0	0.00 0	18000.00 18,000	0.00 0	18000.00 18,000	18000.00

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL MECHANICAL	1.00	JOB	0	0	0	18,000	0	18,000	18000.00
TOTAL TREATMENT SYSTEM EQUIPMENT	1.00	JOB	6,072	0	180,300	22,450	0	208,822	208822.00
2012.60.60. WELL INSTRUMENTS/CONTROLS									
2012.60.60.10. INSTRUMENT CABLE TO WELLHEADS									
MIL EL 6" Stl Cable Tray-Strt Sect,12' (15cm)w/ hangers & Supports			6.73	0.03	5.91	0.00	0.00	12.67	
	500.00	LF	4,323	17	3,793	0	0	8,134	16.27
L MIL EL 12"Stl Cable Tray-Strt Sect,12' (31cm)w/ hangers & Supports			2.25	0.01	6.25	0.00	0.00	8.52	
	2500.00	LF	7,228	29	20,076	0	0	27,333	10.93
MIL EL 12"(31cm)Horz 90,Stl Cable Tray			79.01	0.32	38.68	0.00	0.00	118.01	
	5.00	EA	507	2	248	0	0	758	151.52
MIL EL 12"(31cm)Horz "T",Stl Cable Tray			166.80	0.67	70.24	0.00	0.00	237.71	
	40.00	EA	8,567	34	3,608	0	0	12,208	305.21
MIL EL 12"-6" Reducer,Steel Cable Tray			52.60	0.21	29.44	0.00	0.00	82.25	
	40.00	EA	2,701	11	1,512	0	0	4,224	105.61
USR EL Signal Wire			60.05	0.24	20.00	0.00	0.00	80.29	
	285.00	KLF	21,973	88	7,319	0	0	29,380	103.09
TOTAL INSTRUMENT CABLE TO WELLHEADS	1.00	JOB	45,300	182	36,556	0	0	82,037	82037.10
2012.60.60.30. WELL INSTRUMENTATION									
USR AA Level Controller			63.49	0.57	600.00	0.00	0.00	664.05	
	33.00	EA	2,095	19	19,800	0	0	21,914	664.05
USR AA Pressure Indicator			63.49	0.57	1000.00	0.00	0.00	1064.05	
	43.00	EA	2,730	24	43,000	0	0	45,754	1064.05
USR AA Temperature Indicator			63.49	0.57	500.00	0.00	0.00	564.05	
	50.00	EA	3,174	28	25,000	0	0	28,203	564.05
USR AA Steam Flow Meter			126.97	1.13	1500.00	0.00	0.00	1628.10	
	11.00	EA	1,397	12	16,500	0	0	17,909	1628.10

2012.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Water Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	2.00 EA	254	2	3,000	0	0	3,256	1628.10
USR AA Vapor Flow Meter		126.97	1.13	1500.00	0.00	0.00	1628.10	
	33.00 EA	4,190	37	49,500	0	0	53,727	1628.10
USR AA Amperage Meter		126.97	1.13	500.00	0.00	0.00	628.10	
	40.00 EA	5,079	45	20,000	0	0	25,124	628.10
TOTAL WELL INSTRUMENTATION	1.00 JOB	18,919	168	176,800	0	0	195,887	195887.15
2012.60.60.40. ELECTRICAL POWER TO WELLS								
AIR EL 2" R.S. Conduit w/Coupling &		6.65	0.03	2.03	0.00	0.00	8.71	
Supp.	800.00 LF	6,826	31	2,085	0	0	8,942	11.18
AIR EL 3" R.S. Conduit w/Coupling &		7.31	0.03	4.10	0.00	0.00	11.44	
Supp.	800.00 LF	7,509	34	4,211	0	0	11,754	14.69
AIR EL 1" R.S. Conduit w/Coupling &		4.18	0.02	0.95	0.00	0.00	5.15	
Supp.	800.00 LF	4,298	20	976	0	0	5,293	6.62
CIV EL 1/4" Nylon Pull Cord Installe		0.29	0.00	0.39	0.00	0.00	0.68	
d	8000.00 LF	2,960	12	3,974	0	0	6,947	0.87
Cable Installation Methods								
MIL EL No 12-Type THWN		159.32	0.72	76.82	0.00	0.00	236.87	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	409	2	197	0	0	608	304.13
MIL EL No 8-Type THWN		264.40	1.20	229.64	0.00	0.00	495.24	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	679	3	590	0	0	1,272	635.88
MIL EL No 10-Type THWN		200.43	0.91	123.23	0.00	0.00	324.58	
600V Cu,Sgl Strd,Pl in Cnd,12 'Hg	2.00 MLF	515	2	316	0	0	834	416.75
TOTAL ELECTRICAL POWER TO WELLS	1.00 JOB	23,196	104	12,350	0	0	35,650	35649.94
TOTAL WELL INSTRUMENTS/CONTROLS	1.00 JOB	87,414	454	225,706	0	0	313,574	313574.19
TOTAL TREATMENT SYSTEM CONSTRUCTION		808,552	32,746	1,326,056	1,880,798	59,509	4,107,661	

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.65. START UP, TESTING, O&M PLAN								
2012.65. 5. O&M MANUAL								
2012.65. 5.10. PCS Commissioning Manual								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I	40.00 HR	3,652	0	0	0	0	3,652	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	16.00 HR	616	0	0	0	0	616	38.50
USR AA ODC's		0.00	0.00	0.00	0.00	500.00	500.00	
	1.00 LS	0	0	0	0	500	500	500.00
TOTAL PCS Commissioning Manual	1.00 EA	4,268	0	0	0	500	4,768	4768.00
2012.65. 5.13. Preliminary Draft - O&M Manual Spec Section 01830								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	60.00 HR	2,310	0	0	0	0	2,310	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Site Superintendant		61.99	0.00	0.00	0.00	0.00	61.99	
	8.00 HR	496	0	0	0	0	496	61.99
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I; Project Manager	20.00 HR	1,826	0	0	0	0	1,826	91.30
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol Officer	20.00 HR	1,694	0	0	0	0	1,694	84.70
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III Health and Safety Manager (CIH)	4.00 HR	414	0	0	0	0	414	103.40
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40

2012.65. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL Preliminary Draft - O&M Manua	1.00	EA	23,239	0	0	0	600	23,839	23839.48
2012.65. 5.18. Revised Draft - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	60.00	HR	4,026	0	0	0	0	4,026	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	20.00	HR	770	0	0	0	0	770	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	16.00	HR	1,461	0	0	0	0	1,461	91.30
USR AA Contractors Chem Quality Control Officer			84.70	0.00	0.00	0.00	0.00	84.70	
	4.00	HR	339	0	0	0	0	339	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist			84.70	0.00	0.00	0.00	0.00	84.70	
	8.00	HR	678	0	0	0	0	678	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)			103.40	0.00	0.00	0.00	0.00	103.40	
	2.00	HR	207	0	0	0	0	207	103.40
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	8.00	HR	475	0	0	0	0	475	59.40
TOTAL Revised Draft - O&M Manual	1.00	EA	7,955	0	0	0	600	8,555	8555.20
2012.65. 5.23. Final - O&M Manual									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Principal Engineer/Scientist I; Project Manager			91.30	0.00	0.00	0.00	0.00	91.30	
	8.00	HR	730	0	0	0	0	730	91.30

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	2.00 HR	169	0	0	0	0	169	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00 HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	1.00 HR	103	0	0	0	0	103	103.40
Health and Safety Manager (CIH)								
USR AA Technician VI - Plant Operato		35.42	0.00	0.00	0.00	0.00	35.42	
r	20.00 HR	708	0	0	0	0	708	35.42
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	4.00 HR	238	0	0	0	0	238	59.40
TOTAL Final - O&M Manual	1.00 EA	5,280	0	0	0	600	5,880	5880.00
TOTAL O&M MANUAL	1.00 JOB	40,743	0	0	0	2,300	43,043	43042.68
2012.65.10. STARTUP/COMMISSION TREATMENT SYS								
2012.65.10. 5. ENGINEERS & TECHNICIANS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	80.00 HR	8,272	0	0	0	0	8,272	103.40
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
-	320.00 HR	23,232	0	0	0	0	23,232	72.60
Startup/Provecut Project Manager								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	240.00 HR	21,912	0	0	0	0	21,912	91.30
P&ID Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	80.00 HR	7,304	0	0	0	0	7,304	91.30
I&E Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	120.00 HR	10,956	0	0	0	0	10,956	91.30
PC/MMI Checkout								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00 HR	18,260	0	0	0	0	18,260	91.30
PC/MMI Programmer								

2012.65. START UP, TESTING, O&M PLAN	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I;	200.00	HR	18,260	0	0	0	0	18,260	91.30
Startup Engineer									
USR AA Senior Engineer/Scientist IV			84.70	0.00	0.00	0.00	0.00	84.70	
-	16.00	HR	1,355	0	0	0	0	1,355	84.70
Director QA/QC									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Technician/Analyst IV -			33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	40.00	HR	1,320	0	0	0	0	1,320	33.00
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00	HR	6,776	0	0	0	0	6,776	84.70
MIL AA Electricians			35.93	0.00	0.00	0.00	0.00	35.93	
	80.00	HR	2,874	0	0	0	0	2,874	35.93
USR AA Vendor/Manufacturers Reps;			0.00	0.00	0.00	4000.00	0.00	4000.00	
Installation and Startup	8.00	EA	0	0	0	32,000	0	32,000	4000.00
USR AA Site QC/HSO			43.47	0.00	0.00	0.00	0.00	43.47	
	270.00	HR	11,737	0	0	0	0	11,737	43.47
USR AA Electrical Specialist			0.00	0.00	0.00	101.00	0.00	101.00	
	172.00	HR	0	0	0	17,372	0	17,372	101.00
USR AA Staff Professional			0.00	0.00	0.00	106.00	0.00	106.00	
	172.00	HR	0	0	0	18,232	0	18,232	106.00
TOTAL ENGINEERS & TECHNICIANS	1.00	JOB	135,162	0	0	67,604	0	202,766	202766.36
2012.65.10.10. TRAVEL & PER DIEM									
USR AA Mileage on Personal Car, Trip			0.00	0.00	0.00	0.00	0.31	0.31	
s	16000	MI	0	0	0	0	4,960	4,960	0.31
for O&M Proj Mgr from office.									
USR AA Apartments for site personnel			0.00	0.00	0.00	0.00	1600.00	1600.00	
Mgr and HSO.	8.00	MO	0	0	0	0	12,800	12,800	1600.00
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	120.00	DAY	0	0	0	0	5,040	5,040	42.00
USR AA Airfare Trips for Vendor Reps			0.00	0.00	0.00	0.00	500.00	500.00	
and Instrumentation and	10.00	EA	0	0	0	0	5,000	5,000	500.00
Electrical Engineering									

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
personnel.								
USR AA Rental Car, Total of 4 cars f		0.00	0.00	0.00	0.00	45.00	45.00	
or	80.00 DAY	0	0	0	0	3,600	3,600	45.00
two months.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	20.00 EA	0	0	0	0	400	400	20.00
TOTAL TRAVEL & PER DIEM	1.00 JOB	0	0	0	0	31,800	31,800	31800.00
2012.65.10.15. EQUIPMENT/SUPPLIES								
USR AA Misc Supplies, PPE, Work Clot		0.00	0.00	5000.00	0.00	0.00	5000.00	
hes	1.00 LS	0	0	5,000	0	0	5,000	5000.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	4.00 MO	0	5,200	0	0	800	6,000	1500.00
MIL AA TRK,HWY, 6,250GVW,4X4, 1/2T-P		0.00	7.52	0.00	0.00	0.00	7.52	
KUP	640.00 HR	0	4,814	0	0	0	4,814	7.52
TOTAL EQUIPMENT/SUPPLIES	1.00 JOB	0	10,014	5,000	0	800	15,814	15814.02
2012.65.10.25. UTILITIES/SITE FACILITIES								
USR AA Fax Machine		0.00	0.00	0.00	0.00	35.00	35.00	
	2.00 MO	0	0	0	0	70	70	35.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	3.00 MO	0	0	0	0	225	225	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	2.00 MO	0	0	0	0	800	800	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	2.00 MO	0	0	0	0	400	400	200.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	2.00 MO	0	0	800	0	0	800	400.00
USR AA Contractors Office Trailer		0.00	400.00	0.00	0.00	0.00	400.00	
	2.00 MO	0	800	0	0	0	800	400.00

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA COE Office Trailer		0.00	300.00	0.00	0.00	0.00	300.00	
	2.00 MO	0	600	0	0	0	600	300.00
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	2.00 MO	0	200	0	0	0	200	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	2.00 MO	0	0	0	0	100	100	50.00
USR AA Small Tool Allowance		0.00	0.00	3000.00	0.00	0.00	3000.00	
	2.00 LS	0	0	6,000	0	0	6,000	3000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 MO	0	0	0	400	0	400	200.00
USR AA Phone Bill		0.00	0.00	0.00	0.00	700.00	700.00	
	2.00 MO	0	0	0	0	1,400	1,400	700.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	5000.00	5000.00	
	2.00 MO	0	0	0	0	10,000	10,000	5000.00
USR AA Water		0.00	0.00	0.00	400.00	0.10	400.10	
	2.00 MO	0	0	0	800	0	800	400.10
TOTAL UTILITIES/SITE FACILITIES	1.00 JOB	0	1,600	6,800	1,200	13,395	22,995	22995.20
2012.65.10.30. CHEMICALS								
USR AA GAC (Liquid); average useage		0.00	0.00	1.87	0.00	0.00	1.87	
35 lb/day x 30 days operation	1050.00 LB	0	0	1,964	0	0	1,964	1.87
USR AA GAC (Air); 40 lb/ day x 30 da		0.00	0.00	2.30	0.00	0.00	2.30	
ys operation = 1200 lb.	1200.00 LB	0	0	2,760	0	0	2,760	2.30
USR AA Alum		0.00	0.00	2.00	0.00	0.00	2.00	
	1050.00 LB	0	0	2,100	0	0	2,100	2.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	10000 LB	0	0	1,500	0	0	1,500	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Polymer, One 55 gal drum/mo.		0.00	0.00	1.78	0.00	0.00	1.78	
	135.00 LB	0	0	240	0	0	240	1.78

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	1500.00 LB	0	0	60	0	0	60	0.04
TOTAL CHEMICALS	1.00 JOB	0	0	8,624	2,000	0	10,624	10623.80
2012.65.10.35. FILTERS, OTHER CONSUMABLES								
USR AA Filter A		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter B		0.00	0.00	6.70	0.00	0.00	6.70	
	80.00 EA	0	0	536	0	0	536	6.70
USR AA Filter C Cartridges		0.00	0.00	21.20	0.00	0.00	21.20	
	230.00 EA	0	0	4,876	0	0	4,876	21.20
USR AA Filter D		0.00	0.00	6.70	0.00	0.00	6.70	
	24.00 EA	0	0	161	0	0	161	6.70
TOTAL FILTERS, OTHER CONSUMABLES	1.00 JOB	0	0	6,109	0	0	6,109	6108.80
2012.65.10.40. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	3.00 MO	0	1,350	0	0	0	1,350	450.00
USR AA LEL		0.00	200.00	0.00	0.00	0.00	200.00	
	3.00 MO	0	600	0	0	0	600	200.00
USR AA PPE - Level D Modified		0.00	0.00	2400.00	0.00	0.00	2400.00	
	1.50 MO	0	0	3,600	0	0	3,600	2400.00
TOTAL HEALTH & SAFETY	1.00 JOB	0	1,950	3,600	0	0	5,550	5550.00
2012.65.10.50. PERSONNEL TRAINING								
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
CIH	20.00 HR	1,342	0	0	0	0	1,342	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	40.00 HR	2,125	0	0	0	0	2,125	53.13

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	24.00 HR	1,610	0	0	0	0	1,610	67.10
USR AA Technician/Analyst IV -		33.00	0.00	0.00	0.00	0.00	33.00	
Secretary	16.00 HR	528	0	0	0	0	528	33.00
USR AA Misc Materials		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL PERSONNEL TRAINING	1.00 JOB	8,510	0	500	0	0	9,010	9009.60

2012.65.10.55. SAMPLING/ANALYSIS; STARTUP

2012.65.10.55.05. DATA VALIDATION

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	27.00 HR	1,604	0	0	0	0	1,604	59.40
TOTAL DATA VALIDATION	1.00 JOB	1,604	0	0	0	0	1,604	1603.80

2012.65.10.55.30. ANALYTICALS PROCESS
Influent and Effluent 2 times per week during startup operation
Process sampling points (2). 4 weeks of proveout/testing = 8 sampling
events @ 2 points = 16 plus qc = 18 samples.

Startup analyticals priced at 24 hour TAT.

AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	13.00 EA	0	0	1,287	0	0	1,287	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	26.00 EA	0	0	131	0	0	131	5.02
M HTW AA TAL Metals		0.00	0.00	80.00	0.00	0.00	80.00	
	18.00 EA	0	0	1,440	0	0	1,440	80.00
HTW AA TCL VOC (SW-846, 8260B)		0.00	0.00	296.00	0.00	0.00	296.00	
Includes 4 trip blanks.	22.00 EA	0	0	6,512	0	0	6,512	296.00
M HTW AA TPH EPA 418.1		0.00	0.00	120.00	0.00	0.00	120.00	
	18.00 EA	0	0	2,160	0	0	2,160	120.00

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA TCL SVOC (SW-846, 8270C)		0.00	0.00	564.00	0.00	0.00	564.00	
	18.00 EA	0	0	10,152	0	0	10,152	564.00
HTW AA Suspended Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
HTW AA Dissolved Solids		0.00	0.00	17.00	0.00	0.00	17.00	
	18.00 EA	0	0	306	0	0	306	17.00
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	280.00	0.00	0.00	280.00	
	18.00 EA	0	0	5,040	0	0	5,040	280.00
TOTAL ANALYTICALS PROCESS	1.00 JOB	0	0	32,124	0	0	32,124	32123.52
2012.65.10.55.40. BOILER AIR EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	5.00 EA	0	0	0	1,375	0	1,375	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	5.00 EA	0	0	0	300	0	300	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	5.00 EA	0	0	0	175	0	175	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	5.00 EA	0	0	0	500	0	500	100.00
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA CO		0.00	0.00	0.00	115.00	0.00	115.00	
	5.00 EA	0	0	0	575	0	575	115.00
USR AA SOx		0.00	0.00	0.00	150.00	0.00	150.00	
	5.00 EA	0	0	0	750	0	750	150.00

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	5.00 EA	0	0	0	750	0	750	150.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	10.00 EA	0	0	990	0	0	990	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	10.00 EA	0	0	50	0	0	50	5.02
USR AA Tedlar Bags		0.00	0.00	10.00	0.00	0.00	10.00	
	100.00 EA	0	0	1,000	0	0	1,000	10.00
TOTAL BOILER AIR EMISSIONS	1.00 JOB	0	0	2,040	9,575	0	11,615	11615.20
2012.65.10.55.45. VAPOR PH GAC EMISSIONS								
USR AA SVOC's		0.00	0.00	0.00	275.00	0.00	275.00	
	2.00 EA	0	0	0	550	0	550	275.00
USR AA Dioxins/Furans		0.00	0.00	0.00	950.00	0.00	950.00	
	2.00 EA	0	0	0	1,900	0	1,900	950.00
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	2.00 EA	0	0	0	120	0	120	60.00
USR AA Metals (Ag, As, Ba, Be)		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA PM		0.00	0.00	0.00	35.00	0.00	35.00	
	2.00 EA	0	0	0	70	0	70	35.00
USR AA HCL		0.00	0.00	0.00	100.00	0.00	100.00	
	2.00 EA	0	0	0	200	0	200	100.00
USR AA Chlorine		0.00	0.00	0.00	40.00	0.00	40.00	
	2.00 EA	0	0	0	80	0	80	40.00
USR AA CO		0.00	0.00	0.00	115.00	0.00	115.00	
	2.00 EA	0	0	0	230	0	230	115.00
USR AA SOx		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00
USR AA NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	2.00 EA	0	0	0	300	0	300	150.00

2012.65. START UP, TESTING, O&M PLAN	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA Tedlar Bags		0.00	0.00	10.00	0.00	0.00	10.00	
	25.00 EA	0	0	250	0	0	250	10.00
TOTAL VAPOR PH GAC EMISSIONS	1.00 JOB	0	0	666	3,830	0	4,496	4496.08
TOTAL SAMPLING/ANALYSIS; STARTUP	1.00 JOB	1,604	0	34,830	13,405	0	49,839	49838.60
2012.65.10.60. SOURCE TEST								
USR AA Source Test		0.00	0.00	0.00	30000.00	0.00	30000.00	
	1.00 JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL SOURCE TEST	1.00 JOB	0	0	0	30,000	0	30,000	30000.00
TOTAL STARTUP/COMMISSION TREATMENT	1.00 JOB	145,276	13,564	65,462	114,209	45,995	384,506	384506.38
TOTAL START UP, TESTING, O&M PLAN	1.00 JOB	186,018	13,564	65,462	114,209	48,295	427,549	427549.06
2012.70. DEMOBILIZATION								
2012.70.21. DEMOBILIZATION								
2012.70.21.01. Removal of Temp Facilities								
USR AA Demobe Contractor Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	2.00 LS	0	0	0	400	0	400	200.00
USR AA Demobe COE Ofc Trailer		0.00	0.00	0.00	200.00	0.00	200.00	
	1.00 LS	0	0	0	200	0	200	200.00
USR AA Demobe Storage Trailer		0.00	0.00	0.00	100.00	0.00	100.00	
	1.00 LS	0	0	0	100	0	100	100.00
CIV AA Remove Portable Decon Facilit		187.66	19.73	25.00	0.00	0.00	232.39	
y	1.00 EA	188	20	25	0	0	232	232.39
Post Abatement Clean Up								
USR AA Removel Water Supply		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00

2012.70. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Remove Furniture in Temp Office			0.00	0.00	0.00	250.00	0.00	250.00	
	1.00	LS	0	0	0	250	0	250	250.00
AIR AA Site Debris Clean-Up & Removal; 01770			284.24	87.95	0.00	0.00	0.00	372.20	
	4.00	AC	1,137	352	0	0	0	1,489	372.20
TOTAL Removal of Temp Facilities	1.00	JOB	1,325	372	25	1,450	0	3,171	3171.18
2012.70.21.02. Removal of Temp Utilities									
USR AA Remove Temp Electricity			0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00	LS	0	0	0	10,000	0	10,000	10000.00
TOTAL Removal of Temp Utilities	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
2012.70.21.04. Demobe of Construction Equipment									
USR AA Demobe Heavy Equipment			0.00	0.00	0.00	0.00	200.00	200.00	
	5.00	EA	0	0	0	0	1,000	1,000	200.00
TOTAL Demobe of Construction Equipm	1.00	JOB	0	0	0	0	1,000	1,000	1000.00
TOTAL DEMOBILIZATION	1.00	JOB	1,325	372	25	11,450	1,000	14,171	14171.18
2012.70.22. REPORTS, CLOSEOUT									
2012.70.22. 5. Closeout Safety Report									
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	12.00	EA	0	0	0	0	600	600	50.00
USR AA Engineer/Scientist III; HSO			50.60	0.00	0.00	0.00	0.00	50.60	
	80.00	HR	4,048	0	0	0	0	4,048	50.60
TOTAL Closeout Safety Report	1.00	JOB	4,356	0	0	0	600	4,956	4956.00

2012.70. DEMOBILIZATION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2012.70.22.10. Record Drawings								
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	20.00 EA	0	0	0	0	1,000	1,000	50.00
USR AA Senior Engineer/Scientist I -		67.10	0.00	0.00	0.00	0.00	67.10	
Draftsman	400.00 HR	26,840	0	0	0	0	26,840	67.10
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
Site Superintendant	160.00 HR	11,616	0	0	0	0	11,616	72.60
USR AA Construction Project Manager		91.30	0.00	0.00	0.00	0.00	91.30	
	80.00 HR	7,304	0	0	0	0	7,304	91.30
TOTAL Record Drawings	1.00 JOB	45,760	0	0	0	1,000	46,760	46760.00
2012.70.22.15. Chemical Data Final Report								
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
-	16.00 HR	1,355	0	0	0	0	1,355	84.70
Chem Qual Control Officer								
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	12.00 EA	0	0	0	0	600	600	50.00
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	80.00 HR	6,776	0	0	0	0	6,776	84.70
TOTAL Chemical Data Final Report	1.00 JOB	8,439	0	0	0	600	9,039	9039.20
2012.70.22.20. Remedial Action Report								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	100.00 HR	10,340	0	0	0	0	10,340	103.40
USR AA Engineer/Scientist II		41.80	0.00	0.00	0.00	0.00	41.80	
	400.00 HR	16,720	0	0	0	0	16,720	41.80
USR AA Senior Engineer/Scientist IV		84.70	0.00	0.00	0.00	0.00	84.70	
	400.00 HR	33,880	0	0	0	0	33,880	84.70
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	400.00 HR	19,360	0	0	0	0	19,360	48.40

2012.70. DEMOBILIZATION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA ODC's			0.00	0.00	0.00	0.00	1000.00	1000.00	
	1.00	LS	0	0	0	0	1,000	1,000	1000.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	80.00	HR	3,080	0	0	0	0	3,080	38.50
TOTAL Remedial Action Report	1.00	JOB	83,380	0	0	0	1,000	84,380	84380.00
TOTAL REPORTS, CLOSEOUT	1.00	JOB	141,935	0	0	0	3,200	145,135	145135.20
TOTAL DEMOBILIZATION	1.00	JOB	143,260	372	25	11,450	4,200	159,306	159306.38
TOTAL HEAT YR 3 STEP 2 & WELLS STEP	1.00	JOB	2,369,026	114,548	1,470,653	2,304,215	1,259,158	7,517,600	7517600.41

2013. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2013. HEAT YR1 STEP 3									
2013. 5. GENERAL CONDITIONS									
2013. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

2013. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2013.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2013.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2013.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2013.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2013.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 LS	0	0	0	15,000	0	15,000	15000.00
USR AA Spare Parts/Maintenance		0.00	0.00	750.00	0.00	0.00	750.00	
	12.00 MO	0	0	9,000	0	0	9,000	750.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	19,000	30,000	0	49,000	4083.33

2013.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST

2013.30. UTILITIES

Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.

Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.

Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.

USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	607001 MBT	0	0	0	0	2,124,504	2,124,504	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	2,555,664	2,555,664	212971.96

2013.35. SITE O&M LABOR & MISC EQUIPMENT

USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57

2013.40. CHEMICALS

USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	20295 LB	0	0	20,295	0	0	20,295	1.00

2013.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	6104.00 LB	0	0	9,156	0	0	9,156	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	22584 LB	0	0	3,388	0	0	3,388	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	56156 LB	0	0	2,246	0	0	2,246	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	36623 LB	0	0	3,662	0	0	3,662	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1831.00 LB	0	0	3,259	0	0	3,259	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
TOTAL CHEMICALS	12.00 MO	0	0	51,770	2,500	0	54,270	4522.53

2013.45. DISPOSALS

2013.45. 5. SLUDGE

Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	122.00 CY	0	0	0	4,880	0	4,880	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	183.00 TON	0	0	0	10,980	0	10,980	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	15,860	0	18,860	1571.67

2013.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2013.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	6104.00 LBS	0	0	0	2,808	0	2,808	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	2,808	0	2,808	233.99
2013.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	20295 LBS	0	0	0	8,118	0	8,118	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,118	0	8,118	676.50
2013.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2013.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2013.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00

2013.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00 MO	0	15,960	250	108,086	0	124,296	10357.99
2013.49. SAMPLING & ANALYSIS								
2013.49. 5. PERFORMANCE MONITORING								
2013.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	304.16	0.00	0.00	304.16	
	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2013.49. 5.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	52.00 EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	52.00 EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	52.00 EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00

2013.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Drill Samples and Handle		0.00	0.00	0.00	34.00	0.00	34.00	
Cuttinigs, Regrout Holes	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geolog		59.40	0.00	0.00	0.00	0.00	59.40	
ist	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
2013.49.10. COMPLIANCE MONITORING								
2013.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al	5.00 EA	0	25,000	0	0	0	25,000	5000.00
low								
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes	4.00 EA	0	0	3,700	0	0	3,700	925.00
Expenses & 10% Admin.								
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00

2013.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	22,800	0	54,100	4508.33
2013.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00 0	0.00 0	0.00 0	140.00 7,700	0.00 0	140.00 7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00 0	0.00 0	0.00 0	155.00 8,525	0.00 0	155.00 8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00 0	0.00 0	0.00 0	40.00 2,200	0.00 0	40.00 2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00 0	0.00 0	0.00 0	950.00 52,250	0.00 0	950.00 52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00 0	0.00 0	4.00 40	0.00 0	0.00 0	4.00 40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00 0	0.00 0	99.00 2,772	0.00 0	0.00 0	99.00 2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00 0	0.00 0	5.02 141	0.00 0	0.00 0	5.02 141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2013.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00 0	0.00 0	950.00 4,750	0.00 0	0.00 0	950.00 4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0.00 0	0.00 0	0.00 0	203.00 1,015	0.00 0	203.00 1,015	203.00

2013.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2013.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

2013.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2013.49.10.25. SAMPLING TECHNICIANS

2013.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2013.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50

2013.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	112,650	8,906	197,348	16445.64
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	26,390	194,266	10,316	293,953	24496.08
2013.55. QC & ANALYTICAL DATA VALIDATION								
2013.55. 5. DATA VALIDATION								
2013.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2013.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2013.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
2013.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2013.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 3	1.00	JOB	1,093,804	67,420	101,990	396,532	2,570,738	4,230,484	4230484.22

2014. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014. HEAT YR2 STEP 3								
2014. 5. GENERAL CONDITIONS								
2014. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist III; Program Mgr.	40.00 HR	103.40 4,136	0.00 0	0.00 0	0.00 0	0.00 0	103.40 4,136	103.40
USR AA Senior Engineer/Scientist II; O&M Project Manager	500.00 HR	72.60 36,300	0.00 0	0.00 0	0.00 0	0.00 0	72.60 36,300	72.60
USR AA Senior Engineer/Scientist II Purchaser	80.00 HR	72.60 5,808	0.00 0	0.00 0	0.00 0	0.00 0	72.60 5,808	72.60
USR AA Engineer/Scientist IV; Regulatory Specialist	40.00 HR	59.40 2,376	0.00 0	0.00 0	0.00 0	0.00 0	59.40 2,376	59.40
USR AA Secretary/Clerical IV	144.00 HR	38.50 5,544	0.00 0	0.00 0	0.00 0	0.00 0	38.50 5,544	38.50
USR AA Contractors Chem Quality Control Officer	20.00 HR	84.70 1,694	0.00 0	0.00 0	0.00 0	0.00 0	84.70 1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	40.00 HR	84.70 3,388	0.00 0	0.00 0	0.00 0	0.00 0	84.70 3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	16.00 HR	103.40 1,654	0.00 0	0.00 0	0.00 0	0.00 0	103.40 1,654	103.40
Assume one visit to site.								
USR AA Principal Engineer/Scientist III; Contractors CQC System Mana	16.00 HR	103.40 1,654	0.00 0	0.00 0	0.00 0	0.00 0	103.40 1,654	103.40
USR AA Principal Engineer/Scientist I - PCS Support	40.00 HR	91.30 3,652	0.00 0	0.00 0	0.00 0	0.00 0	91.30 3,652	91.30
USR AA Consultant	240.00 HR	0.00 0	0.00 0	0.00 0	150.00 36,000	0.00 0	150.00 36,000	150.00
USR AA Mileage on Personal Car	3000.00 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 930	0.31 930	0.31
USR AA M&IE	4.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	42.00 168	42.00 168	42.00

2014. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2014.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2014.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2014.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2014.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 LS	0	0	0	15,000	0	15,000	15000.00
USR AA Spare Parts/Maintenance		0.00	0.00	750.00	0.00	0.00	750.00	
	12.00 MO	0	0	9,000	0	0	9,000	750.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	19,000	30,000	0	49,000	4083.33

2014.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU @ $3.50		0.00	0.00	0.00	0.00	3.50	3.50	
	424901 MBT	0	0	0	0	1,487,154	1,487,154	3.50
USR AA Electricity for Pumps, Treatment Plant, Steam: $60 per K KWH		0.00	0.00	0.00	0.00	60.00	60.00	
	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit		0.00	0.00	0.00	0.00	0.80	0.80	
	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge: 198.00/mon		0.00	0.00	0.00	0.00	198.00	198.00	
	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,918,314	1,918,314	159859.46
2014.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2014.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	20295 LB	0	0	20,295	0	0	20,295	1.00

2014.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	6104.00 LB	0	0	9,156	0	0	9,156	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	22584 LB	0	0	3,388	0	0	3,388	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	56156 LB	0	0	2,246	0	0	2,246	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	36623 LB	0	0	3,662	0	0	3,662	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1831.00 LB	0	0	3,259	0	0	3,259	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
TOTAL CHEMICALS	12.00 MO	0	0	51,770	3,000	0	54,770	4564.19

2014.45. DISPOSALS

2014.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	122.00 CY	0	0	0	4,880	0	4,880	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	183.00 TON	0	0	0	10,980	0	10,980	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	15,860	0	18,860	1571.67

2014.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	6104.00 LBS	0	0	0	2,808	0	2,808	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	2,808	0	2,808	233.99
2014.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	20295 LBS	0	0	0	8,118	0	8,118	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,118	0	8,118	676.50
2014.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2014.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2014.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2014.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	106,586	0	119,286	9940.49
2014.49. SAMPLING & ANALYSIS								
2014.49. 5. PERFORMANCE MONITORING								
2014.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2014.49.10. COMPLIANCE MONITORING								
2014.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2014.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2014.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2014.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2014.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2014.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2014.49.10.25. SAMPLING TECHNICIANS

2014.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2014.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2014.55. QC & ANALYTICAL DATA VALIDATION								
2014.55. 5. DATA VALIDATION								
2014.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2014.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2014.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2014.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2014.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 3	1.00	JOB	1,089,932	64,060	101,840	317,076	1,931,978	3,504,886	3504886.22

2015. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015. HEAT YR3 STEP 3 & WELLS STEP 4								
2015. 5. GENERAL CONDITIONS								
2015. 5.01. FIELD SUPERVISION & MANAGEMENT								
USR AA Engineer/Scientist IV - Field		43.47	0.00	0.00	0.00	0.00	43.47	
Engineer	692.00 HR	30,081	0	0	0	0	30,081	43.47
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	692.00 HR	36,766	0	0	0	0	36,766	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	692.00 HR	13,369	0	0	0	0	13,369	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	692.00 HR	25,625	0	0	0	0	25,625	37.03
MIL AA General Foreman		51.19	0.00	0.00	0.00	0.00	51.19	
	692.00 HR	35,422	0	0	0	0	35,422	51.19
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	692.00 HR	0	3,806	0	0	0	3,806	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging; Assume two apartment		0.00	0.00	0.00	0.00	1000.00	1000.00	
s	6.00 MO	0	0	0	0	6,000	6,000	1000.00
for 3 months ea.								
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	180.00 DAY	0	0	0	0	5,130	5,130	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	2.00 EA	0	0	0	0	1,000	1,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	2.00 EA	0	0	0	0	40	40	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	2000.00 MI	0	0	0	0	700	700	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	141,264	3,806	0	0	12,870	157,940	157939.84
2015. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60

2015. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73

2015. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GENERAL CONDITIONS	12.00 MO	207,471	3,806	0	36,000	14,748	262,025	21835.39
2015.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67
2015.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00

2015.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2015.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2015.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	15000.00	0.00	15000.00	
	1.00 LS	0	0	0	15,000	0	15,000	15000.00
USR AA Spare Parts/Maintenance		0.00	0.00	750.00	0.00	0.00	750.00	
	12.00 MO	0	0	9,000	0	0	9,000	750.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	19,000	30,000	0	49,000	4083.33

2015.30. UTILITIES

Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.

Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.

Makeup water requirements.
Costed at 0.80/750 gallon unit per local utilit

USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00

2015.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Total Gas Requirements in MMB		0.00	0.00	0.00	0.00	3.50	3.50	
TU	424901 MBT	0	0	0	0	1,487,154	1,487,154	3.50
@ $3.50								
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
Plant, Steam: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,918,314	1,918,314	159859.46
2015.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2015.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	20295 LB	0	0	20,295	0	0	20,295	1.00
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	6104.00 LB	0	0	9,156	0	0	9,156	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	22584 LB	0	0	3,388	0	0	3,388	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	56156 LB	0	0	2,246	0	0	2,246	0.04

2015.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	36623 LB	0	0	3,662	0	0	3,662	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	1831.00 LB	0	0	3,259	0	0	3,259	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2441.00 LB	0	0	4,882	0	0	4,882	2.00
TOTAL CHEMICALS	12.00 MO	0	0	51,770	2,500	0	54,270	4522.53

2015.45. DISPOSALS

2015.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	122.00 CY	0	0	0	4,880	0	4,880	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	183.00 TON	0	0	0	10,980	0	10,980	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	15,860	0	18,860	1571.67

2015.45.10. CARBON (GAC, VAPOR PHASE)
Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.

USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	6104.00 LBS	0	0	0	2,808	0	2,808	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	2,808	0	2,808	233.99

2015.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	20295 LBS	0	0	0	8,118	0	8,118	0.40

2015.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	8,118	0	8,118	676.50
2015.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2015.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2015.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	106,586	0	119,286	9940.49

2015.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015.49. SAMPLING & ANALYSIS								
2015.49. 5. PERFORMANCE MONITORING								
2015.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2015.49.10. COMPLIANCE MONITORING								
2015.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00

2015.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	22,800	0	54,100	4508.33
2015.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2015.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00	0.00	950.00	0.00	0.00	950.00	
		0	0	4,750	0	0	4,750	950.00

2015.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0.00 0	0.00 0	0.00 0	203.00 1,015	0.00 0	203.00 1,015	203.00
M AIR AA PCP/Semivolatile Organics (8270)	5.00 EA	0.00 0	0.00 0	0.00 0	225.00 1,125	0.00 0	225.00 1,125	225.00
M AIR AA TAL Metals (6010/7000s)	5.00 EA	0.00 0	0.00 0	0.00 0	40.00 200	0.00 0	40.00 200	40.00
USR AA TPH	5.00 EA	0.00 0	0.00 0	0.00 0	87.00 435	0.00 0	87.00 435	87.00
AIR AA Packing Tape Per Roll	2.00 EA	0.00 0	0.00 0	4.00 8	0.00 0	0.00 0	4.00 8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	4.00 EA	0.00 0	0.00 0	99.00 396	0.00 0	0.00 0	99.00 396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	4.00 EA	0.00 0	0.00 0	5.02 20	0.00 0	0.00 0	5.02 20	5.02
USR AA TCLP (As, Cr, SVOC)	8.00 EA	0.00 0	0.00 0	0.00 0	740.00 5,920	0.00 0	740.00 5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2015.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH	14.00 EA	0.00 0	0.00 0	0.00 0	60.00 840	0.00 0	60.00 840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0.00 0	0.00 0	0.00 0	140.00 1,960	0.00 0	140.00 1,960	140.00
M AIR AA PCP/Semivolatile Organics (8270)	14.00 EA	0.00 0	0.00 0	0.00 0	155.00 2,170	0.00 0	155.00 2,170	155.00
M AIR AA TAL Metals (6010/7000s)	14.00 EA	0.00 0	0.00 0	0.00 0	40.00 560	0.00 0	40.00 560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	5.00 EA	0.00 0	0.00 0	0.00 0	950.00 4,750	0.00 0	950.00 4,750	950.00

2015.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2015.49.10.25. SAMPLING TECHNICIANS

2015.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2015.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40

2015.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	112,650	8,906	197,348	16445.64
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	118,010	8,906	212,415	17701.25
2015.55. QC & ANALYTICAL DATA VALIDATION								
2015.55. 5. DATA VALIDATION								
2015.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2015.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2015.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50

2015.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
2015.60. TREATMENT SYSTEM CONSTRUCTION									
2015.60.10. INSTALL WELLS									
2015.60.10. 5. EXTRACTION WELLS THERMAL Installation of Extraction wells includes installation of pumps, level sensors/controlls, development, handling of cuttings,									
2015.60.10. 5. 8. "A" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	120.00	LFT	0	0	0	16,200	0	16,200	135.00
TOTAL "A" ZONE WELLS	1.00	JOB	0	0	0	16,200	0	16,200	16200.00
2015.60.10. 5.16. "B" ZONE WELLS									
USR AA Extraction Wells, Thermal			0.00	0.00	0.00	135.00	0.00	135.00	
	380.00	LFT	0	0	0	51,300	0	51,300	135.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	51,300	0	51,300	51300.00
2015.60.10. 5.30. EXTRACTION PUMPS									
USR AA Extraction Pumps Incl Controllers			0.00	0.00	2500.00	0.00	0.00	2500.00	
	6.00	EA	0	0	15,000	0	0	15,000	2500.00
USR AA Discharge Tubing Pump to Wellhead; SS			0.00	0.00	11.00	0.00	0.00	11.00	
	700.00	LFT	0	0	7,700	0	0	7,700	11.00
USR AA Air Supply Tubing Wellhead to Pumps			0.00	0.00	6.00	0.00	0.00	6.00	
	700.00	LFT	0	0	4,200	0	0	4,200	6.00
USR AA Pulse Counters w/ 4-20 ma Signal			0.00	0.00	395.00	0.00	0.00	395.00	
	6.00	EA	0	0	2,370	0	0	2,370	395.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Downwell Liquid Level Bubbler Tube	700.00 LFT	0.00 0	0.00 0	2.00 1,400	0.00 0	0.00 0	2.00 1,400	2.00
USR AA Spare Parts; Initial Supply f or Pumps	1.00 LS	0.00 0	0.00 0	500.00 500	0.00 0	0.00 0	500.00 500	500.00
USR AA Connection Fittings; Air & Discharg Tubing/Manifolds, Et c.	6.00 EA	0.00 0	0.00 0	200.00 1,200	0.00 0	0.00 0	200.00 1,200	200.00
TOTAL EXTRACTION PUMPS	82.00 EA	0	0	32,370	0	0	32,370	394.76
2015.60.10. 5.35. INSTALL PUMPS, INSTRUMENTS								
USR AA Install Pumps	6.00 EA	0.00 0	0.00 0	0.00 0	725.00 4,350	0.00 0	725.00 4,350	725.00
USR AA Install Down-hole Instruments	6.00 EA	0.00 0	0.00 0	0.00 0	450.00 2,700	0.00 0	450.00 2,700	450.00
TOTAL INSTALL PUMPS, INSTRUMENTS	82.00 EA	0	0	0	7,050	0	7,050	85.98
2015.60.10. 5.45. WELL TOP COMPLETION								
USR AA 12" Protective Casing & SS Flange on 6" Pipe	6.00 EA	0.00 0	0.00 0	0.00 0	250.00 1,500	0.00 0	250.00 1,500	250.00
TOTAL WELL TOP COMPLETION	82.00 EA	0	0	0	1,500	0	1,500	18.29
2015.60.10. 5.50. WELL DEVELOPMENT								
USR AA Develop Well	6.00 EA	0.00 0	0.00 0	0.00 0	1000.00 6,000	0.00 0	1000.00 6,000	1000.00
TOTAL WELL DEVELOPMENT	82.00 EA	0	0	0	6,000	0	6,000	73.17
TOTAL EXTRACTION WELLS THERMAL	1.00 JOB	0	0	32,370	82,050	0	114,420	114420.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015.60.10.10. STEAM INJECTION WELLS									
Injection well pricing includes development, handling of cuttings and liquid wastes,									
2015.60.10.10. 5. "A" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	3180.00	LFT	0	0	0	429,300	0	429,300	135.00
TOTAL "A" ZONE WELLS	1.00	JOB	0	0	0	429,300	0	429,300	429300.00
2015.60.10.10.10. "B" ZONE WELLS									
USR AA Injection Wells			0.00	0.00	0.00	135.00	0.00	135.00	
	5130.00	LFT	0	0	0	692,550	0	692,550	135.00
TOTAL "B" ZONE WELLS	1.00	JOB	0	0	0	692,550	0	692,550	692550.00
2015.60.10.10.35. INSTALL INSTRUMENTS									
USR AA Install Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	107.00	EA	0	0	0	173,875	0	173,875	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	173,875	0	173,875	173875.00
2015.60.10.10.45. WELL TOP COMPLETION									
USR AA 12" Protective Casing & SS Flange on 6" Pipe			0.00	0.00	0.00	250.00	0.00	250.00	
	107.00	EA	0	0	0	26,750	0	26,750	250.00
TOTAL WELL TOP COMPLETION	1.00	JOB	0	0	0	26,750	0	26,750	26750.00
2015.60.10.10.50. WELL DEVELOPMENT									
USR AA Develop Well			0.00	0.00	0.00	1000.00	0.00	1000.00	
	107.00	EA	0	0	0	107,000	0	107,000	1000.00
TOTAL WELL DEVELOPMENT	1.00	JOB	0	0	0	107,000	0	107,000	107000.00
TOTAL STEAM INJECTION WELLS	1.00	JOB	0	0	0	1,429,475	0	1,429,475	1429475.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015.60.10.20. MONITORING WELLS									
2015.60.10.20. 5. INSTALL WELLS									
USR AA Install 4" Monitoring Wells, SS Casing and Screens			0.00	0.00	0.00	100.00	0.00	100.00	
	1859.00	LFT	0	0	0	185,900	0	185,900	100.00
TOTAL INSTALL WELLS	4.00	EA	0	0	0	185,900	0	185,900	46475.00
2015.60.10.20.15. PUMPS & PERM SAMPLING EQUIPMENT									
M AIR AA Lo Flo Pump & Teflon Tubing			0.00	0.00	550.00	0.00	0.00	550.00	
	13.00	EA	0	0	7,150	0	0	7,150	550.00
USR AA Misc Tools & Sampling Equipment			0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00	EA	0	0	1,000	0	0	1,000	1000.00
USR AA Install Lo-Flo Pumps and Discharge/Sampling System			0.00	0.00	0.00	100.00	0.00	100.00	
	13.00	EA	0	0	0	1,300	0	1,300	100.00
USR AA Sample Pump Tubing, Teflon Lined			0.00	0.00	3.50	0.00	0.00	3.50	
	1600.00	LFT	0	0	5,600	0	0	5,600	3.50
USR AA Slip On Well Cap Assbly			0.00	0.00	65.00	0.00	0.00	65.00	
	13.00	EA	0	0	845	0	0	845	65.00
USR AA Flexible Discharge Tubing Adaptor			0.00	0.00	23.00	0.00	0.00	23.00	
	13.00	EA	0	0	299	0	0	299	23.00
TOTAL PUMPS & PERM SAMPLING EQUIPME	1.00	JOB	0	0	14,894	1,300	0	16,194	16194.00
2015.60.10.20.35. INSTALL INSTRUMENTS									
USR AA Install Pumps & Downhole Instruments			0.00	0.00	0.00	1625.00	0.00	1625.00	
	26.00	EA	0	0	0	42,250	0	42,250	1625.00
TOTAL INSTALL INSTRUMENTS	1.00	JOB	0	0	0	42,250	0	42,250	42250.00
2015.60.10.20.45. WELL TOP COMPLETION									
USR AA Protective Casing & Cap 4" Pipe			0.00	0.00	0.00	250.00	0.00	250.00	
	13.00	EA	0	0	0	3,250	0	3,250	250.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WELL TOP COMPLETION	1.00 JOB	0	0	0	3,250	0	3,250	3250.00
2015.60.10.20.50. WELL DEVELOPMENT								
USR AA Develop Well		0.00	0.00	0.00	1000.00	0.00	1000.00	
	13.00 EA	0	0	0	13,000	0	13,000	1000.00
TOTAL WELL DEVELOPMENT	1.00 JOB	0	0	0	13,000	0	13,000	13000.00
TOTAL MONITORING WELLS	1.00 JOB	0	0	14,894	245,700	0	260,594	260594.00

2015.60.10.25. TREAT WELL DRILL LIQUIDS/CUTTING

During drilling and development of wells the cuttings will be put in RO/RO by drilling sub and stockpiled on site on HDPE pad w/sump and pump for drainage of liquids. The cuttings will be covered with HDPE or durable plastic. A piping system to deliver steam and remove steam/vapors from the stockpile will be installed before and after placement. When the boilers and water treatment systems are ready the stockpile will be steamed to remove organics. The cuttings, after cleaning, will be spread on site as fill.

The liquiids from well development and drainage from the cuttings will be treated on-site with a portable treatment plant and the treated liquid discharged to the POTW.

USR AA RO/RO MOBE/RENTAL		0.00	0.00	0.00	400.00	0.00	400.00	
	48.00 EA	0	0	0	19,200	0	19,200	400.00
USR AA Frac Tank Rental		0.00	1000.00	0.00	0.00	0.00	1000.00	
	20.00 MO	0	20,000	0	0	0	20,000	1000.00
USR AA Treat Contaminated Water w/Portable On-site Treatment Plant	180180 GAL	0.00	0.00	0.00	0.25	0.00	0.25	
		0	0	0	45,045	0	45,045	0.25
USR AA Onsite Steam Strip Drill Cuttings		1.80	0.03	0.00	0.00	55.00	56.83	
	1000.00 TON	1,800	31	0	0	55,000	56,831	56.83
USR AA POTW Customer Charge		0.00	0.00	0.00	207.33	0.00	207.33	
	1.00 LS	0	0	0	207	0	207	207.33
USR AA POTW Treatment Charge		0.00	0.00	0.00	89044.22	0.00	89044.22	
	0.18 MGL	0	0	0	16,028	0	16,028	89044.22
USR AA POTW Collection Charge		0.00	0.00	0.00	14465.00	0.00	14465.00	
	0.18 MGL	0	0	0	2,604	0	2,604	14465.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA POTW BOD Charge		0.00	0.00	0.00	38711.31	0.00	38711.31	
	0.05 KLB	0	0	0	1,990	0	1,990	38711.31
USR AA POTW SS Charges		0.00	0.00	0.00	17469.30	0.00	17469.30	
	0.08 KLB	0	0	0	1,345	0	1,345	17469.30
TOTAL TREAT WELL DRILL LIQUIDS/CUTT	1.00 JOB	1,800	20,031	0	86,419	55,000	163,250	163250.29

2015.60.10.30. ANALYTICALS SOILS
Well installation soil samples - initial baseline.

M HTW AA Total Petroleum Hydrocarbons		0.00	0.00	0.00	87.00	0.00	87.00	
(TPH)	22.00 EA	0	0	0	1,914	0	1,914	87.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	161.00	0.00	161.00	
Hydrocarbons, PAH(SW3510/SW83	22.00 EA	0	0	0	3,542	0	3,542	161.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	180.00	0.00	180.00	
70)	22.00 EA	0	0	0	3,960	0	3,960	180.00
TOTAL ANALYTICALS SOILS	1.00 JOB	0	0	0	9,416	0	9,416	9416.00

2015.60.10.35. ANALYTICALS LIQUIDS
Initital baseline samples from monitoring wells and new wells.

M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	66.00 EA	0	0	0	9,240	0	9,240	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	66.00 EA	0	0	0	10,230	0	10,230	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	66.00 EA	0	0	0	2,640	0	2,640	40.00
M HTW AA Total Organic Carbons (90600		0.00	0.00	0.00	55.00	0.00	55.00	
	66.00 EA	0	0	0	3,630	0	3,630	55.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	11.00 EA	0	0	0	10,450	0	10,450	950.00
TOTAL ANALYTICALS LIQUIDS	1.00 JOB	0	0	0	36,190	0	36,190	36190.00

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2015.60.10.40. LABOR & ODC's Geologist to work with drillers for soil visual inspection/classification & sampling. Sampling team and equipment to sample wells as well development is completed.									
USR AA Engineer/Scientist IV, Geolog			59.40	0.00	0.00	0.00	0.00	59.40	
ist	160.00	HR	9,504	0	0	0	0	9,504	59.40
USR AA Engineer/Scientist IV, Sampli			59.40	0.00	0.00	0.00	0.00	59.40	
ng Lead	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	40.00	HR	2,684	0	0	0	0	2,684	67.10
USR AA Technician/Analyst IV, Sampli			33.00	0.00	0.00	0.00	0.00	33.00	
ng Tech	80.00	HR	2,640	0	0	0	0	2,640	33.00
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	16.00	HR	1,162	0	0	0	0	1,162	72.60
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00	MI	0	0	0	0	186	186	0.31
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	8.00	HR	387	0	0	0	0	387	48.40
USR AA Lodging			0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	10.00	DAY	0	0	0	0	1,980	1,980	198.00
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	8.00	HR	308	0	0	0	0	308	38.50
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	10.00	DAY	0	0	0	0	420	420	42.00
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	10.00	EA	0	0	0	0	500	500	50.00
USR AA Tolls			0.00	0.00	0.00	0.00	12.00	12.00	
	4.00	EA	0	0	0	0	48	48	12.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	1.00	EA	0	0	0	50	0	50	50.00
USR AA Hose			0.00	0.00	2.50	0.00	0.00	2.50	
	400.00	LFT	0	0	1,000	0	0	1,000	2.50

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Misc Sampling		0.00	0.00	400.00	0.00	0.00	400.00	
Equipment/Materials	1.00 LS	0	0	400	0	0	400	400.00
TOTAL LABOR & ODC's	1.00 JOB	19,061	0	1,400	50	3,134	23,645	23644.80
TOTAL INSTALL WELLS	1.00 JOB	20,861	20,031	48,664	1,889,300	58,134	2,036,990	2036990.09
2015.60.15. PIPING								
2015.60.15. 5. VAPOR RECOVERY SYSTEM								
L MIL PL 4"(10cm) Black Pipe,PE Sch40		5.94	0.14	4.72	0.00	0.00	10.79	
A53	400.00 LF	3,049	71	2,423	0	0	5,543	13.86
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	676.00 LF	6,870	161	2,838	0	0	9,868	14.60
MIL PL 4" 90 Degree LR Weld Ell, Std		166.33	3.89	27.57	0.00	0.00	197.80	
Wt	20.00 EA	4,271	100	708	0	0	5,079	253.97
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	107.00 EA	4,350	102	371	0	0	4,822	45.07
L AIR PL Slip On Flange 4"		59.36	1.39	25.70	0.00	0.00	86.45	
	130.00 EA	9,909	232	4,290	0	0	14,430	111.00
MIL PL 4" x 3" Reducer, Eccentric		166.64	3.90	26.44	0.00	0.00	196.98	
	130.00 EA	27,814	651	4,414	0	0	32,879	252.91
MIL PL 4" Cap, Welded, Std Wt		83.32	1.95	11.49	0.00	0.00	96.76	
	2.00 EA	214	5	30	0	0	248	124.24
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	200.00 EA	25,675	244	1,934	0	0	27,853	139.27
USR PL Pipe Supports		59.36	1.39	200.00	0.00	0.00	260.75	
	100.00 EA	7,622	178	25,680	0	0	33,480	334.80
B MIL PL 4"Iron Body,Brz Mtd,Flg,Gate		114.67	1.05	222.65	0.00	0.00	338.37	
Vlv	40.00 EA	5,889	54	11,435	0	0	17,379	434.46
125 #								
USR PL Fit/Cut/Weld 4" pipe to 6" or		237.46	5.55	0.00	0.00	0.00	243.01	
8"	107.00 EA	32,623	763	0	0	0	33,386	312.02
(No Tees required)								

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
B MIL PL 4"D Pipe,.5" Thk Fbgs Pipe Co			7.81	0.05	1.00	0.00	0.00	8.86	
ver	400.00	LF	4,012	27	514	0	0	4,553	11.38
w/Fire Retardant Jackets									
L MIL PL 0.006" Alum Insul Jacket w/Ba			6.25	0.04	0.16	0.00	0.00	6.45	
nds	1000.00	SF	8,023	55	202	0	0	8,280	8.28
TOTAL VAPOR RECOVERY SYSTEM	1.00	JOB	140,321	2,643	54,838	0	0	197,802	197801.76
2015.60.15.10. LIQUID RECOVERY SYSTEM									
AIR PL Pipe, Iron, Threaded, Sch 80			7.64	0.07	6.20	0.00	0.00	13.91	
Black - 2" Dia	300.00	LF	2,945	27	2,388	0	0	5,360	17.87
MIL PL 3"(80mm)Black Pipe,PE Sch 40			7.92	0.19	3.27	0.00	0.00	11.37	
A53	100.00	LF	1,016	24	420	0	0	1,460	14.60
MIL PL 3" 90 Degree LR Weld Ell, Std			96.23	2.25	16.68	0.00	0.00	115.16	
Wt	4.00	EA	494	12	86	0	0	591	147.86
MIL PL 3"Tee,Full Size Butt Weld Std			143.91	3.37	36.78	0.00	0.00	184.06	
Wt	4.00	EA	739	17	189	0	0	945	236.32
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	24.00	EA	976	23	83	0	0	1,082	45.07
AIR PL Slip On Flange 3"			79.15	1.85	20.20	0.00	0.00	101.20	
	6.00	EA	610	14	156	0	0	780	129.94
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask			47.49	0.45	3.89	0.00	0.00	51.84	
et	10.00	EA	610	6	50	0	0	666	66.56
M MIL PL 3" Bronze 125# Gate Valve			70.57	0.65	95.50	0.00	0.00	166.72	
Threaded,Brazed or Soldered	2.00	EA	181	2	245	0	0	428	214.06
MIL PL 1/2"D Plug Valve, Semi-Stl,Sc			23.09	0.19	25.86	0.00	0.00	49.14	
rd	6.00	EA	178	1	199	0	0	379	63.09
Lubricated,Wrench Oper w/Wrench									
M MIL PL 2" Single Disc Type Check Val			37.62	0.33	72.27	0.00	0.00	110.23	
ve	6.00	EA	290	3	557	0	0	849	141.53
IB Wafer Type- 125#									

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M MIL PL 2" Bronze 125# Gate Valve		46.17	0.39	31.68	0.00	0.00	78.24	
Threaded,Brazed or Soldered	12.00 EA	711	6	488	0	0	1,205	100.46
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	1.00 EA	1,974	18	0	0	0	1,991	1991.27
MIL PL 2"D Pipe,1"Thk Fib Pipe Cover		4.50	0.03	0.99	0.00	0.00	5.52	
w/Fire Retardant Jackets	300.00 LF	1,732	12	383	0	0	2,126	7.09
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er w/Fire Retardant Jackets	100.00 LF	610	4	158	0	0	773	7.73
L MIL PL 0.006" Alum Insul Jacket w/Ba		7.81	0.05	0.16	0.00	0.00	8.02	
nds	400.00 SF	4,012	27	81	0	0	4,120	10.30
USR AA Flexible Hose; SS; 5' long; 2		14.84	0.35	150.00	0.00	0.00	165.19	
" dia.	6.00 EA	89	2	900	0	0	991	165.19
TOTAL LIQUID RECOVERY SYSTEM	1.00 JOB	17,166	197	6,383	0	0	23,746	23746.27

2015.60.15.11. EXTRACTION WELLHEAD SPOOL/FTG

Includes 6"x6"x4" Tee or 6" pipe spool with threadolets and other fittings for instruments and vapor and liquid discharge fittings. Vapor discharge through 4" outlet on Tee. Liquid discharge through 1.25" fitting on blind flange at top of "Tee/Spool". Pump Air Supply through fitting on blind.

USR AA Wellhead Fittings/Piping (Sho		474.91	11.11	350.00	0.00	0.00	836.02	
p Fabricated)	6.00 EA	2,849	67	2,100	0	0	5,016	836.02
USR AA Connection Fittings; Air &		118.73	2.78	0.00	0.00	0.00	121.50	
Discharg Tubing/Manifolds; La bor	6.00 EA	712	17	0	0	0	729	121.50
TOTAL EXTRACTION WELLHEAD SPOOL/FTG	1.00 JOB	3,562	83	2,100	0	0	5,745	5745.13

2015.60.15.15. STEAM INJECTION SYSTEM

2015.60.15.15. 5. MAIN HEADER PIPING

MIL PL 4"(10cm) A-53 Pipe, Sch 40		8.98	0.09	6.76	0.00	0.00	15.83	
Not Incl Hangers or Fittings	1200.00 LF	13,833	140	10,418	0	0	24,391	20.33

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 4" 90 Degree Ell,150# MI Blac		52.37	0.53	50.23	0.00	0.00	103.13	
k	12.00 EA	807	8	774	0	0	1,589	132.42
MIL PL 1/2"Thread-O-Let,300# Forge S		31.66	0.74	2.70	0.00	0.00	35.10	
tl	214.00 EA	8,699	203	742	0	0	9,645	45.07
MIL PL 4" Tee, Red Out Butt Weld Std		249.95	5.85	51.39	0.00	0.00	307.19	
Wt	40.00 EA	12,837	300	2,640	0	0	15,777	394.43
AIR AA Slip On Flange 4"		105.54	2.47	25.70	0.00	0.00	133.70	
	130.00 EA	13,720	321	3,341	0	0	17,382	133.70
MIL PL 4"(8@5/8Dx3"Lg)Bolt,Nut&Gaske		99.98	0.95	7.53	0.00	0.00	108.47	
t	130.00 EA	16,689	159	1,257	0	0	18,105	139.27
MIL PL 4" SST Exp Jt, 150 # w/Flg En		306.39	2.92	244.12	0.00	0.00	553.44	
ds	5.00 EA	1,967	19	1,567	0	0	3,553	710.60
Bellows w/Int Sleeves&Ext Covers								
MIL PL Pipe Support		76.64	1.58	27.24	0.00	0.00	105.46	
	120.00 EA	11,809	243	4,196	0	0	16,248	135.40
MIL PL 1"x1"Brz Press Relief Vlv, Th		33.86	0.28	43.73	0.00	0.00	77.87	
rd	5.00 EA	217	2	281	0	0	500	99.99
MIL PL 4"D Pipe,1" Thk Fbgs Pipe Cov		5.10	0.03	1.59	0.00	0.00	6.73	
er	1200.00 LF	7,860	54	2,456	0	0	10,370	8.64
w/Fire Retardant Jackets								
MIL PL 0.006" Alum Insul Jacket w/Ba		8.93	0.06	0.16	0.00	0.00	9.15	
nds	600.00 SF	6,877	47	121	0	0	7,045	11.74
TOTAL MAIN HEADER PIPING	1.00 JOB	95,315	1,495	27,794	0	0	124,604	124604.23
2015.60.15.15.10. LATERAL PIPING								
MIL PL 3"(80mm)Black Pipe,PE Sch 40		7.92	0.19	3.27	0.00	0.00	11.37	
A53	1000.00 LF	10,163	238	4,198	0	0	14,598	14.60
AIR AA Slip On Flange 3"		79.15	1.85	20.20	0.00	0.00	101.20	
	318.00 EA	25,170	589	6,424	0	0	32,183	101.20

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 3"(4@5/8Dx3"Lg) Bolt,Nut&Gask		47.49	0.45	3.89	0.00	0.00	51.84	
et	1070.00 EA	65,246	621	5,350	0	0	71,217	66.56
MIL PL 3" Tee, Red Out Butt Weld Std		143.91	3.37	36.94	0.00	0.00	184.22	
Wt	5.00 EA	924	22	237	0	0	1,183	236.54
MIL PL 3" SST Exp Jt, 150 # w/Flg En		263.84	2.51	209.44	0.00	0.00	475.79	
ds	107.00 EA	36,248	345	28,774	0	0	65,366	610.90
Bellows w/Int Sleeves&Ext Covers								
MIL PL 3" OD Snap-On Plastic Valve T		19.53	0.16	6.00	0.00	0.00	25.70	
ag	428.00 EA	10,735	90	3,296	0	0	14,121	32.99
Includes Insulation								
MIL PL NDT, X-Ray Welds of 3" Dia Pi		50.79	0.45	30.00	0.00	0.00	81.24	
pe	10.00 EA	652	6	385	0	0	1,043	104.31
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	4.00 EA	7,895	70	0	0	0	7,965	1991.27
MIL PL 3"D Pipe,1" Thk Fbgs Pipe Cov		4.75	0.03	1.23	0.00	0.00	6.02	
er	1000.00 LF	6,101	42	1,585	0	0	7,728	7.73
w/Fire Retardant Jackets								
M MIL PL 3" Pipe Support		57.13	1.18	20.00	0.00	0.00	78.31	
	214.00 EA	15,699	323	5,495	0	0	21,517	100.55
M MIL PL 3"CI Butterfly Vlv, w/Iron Di		61.16	0.56	56.88	0.00	0.00	118.60	
sc	214.00 EA	16,805	154	15,629	0	0	32,588	152.28
w/On-Off Hdl,150 PSI CWP w/Wafer								
M MIL PL 3" Flg St Press Regul&Reducer		128.35	3.00	1963.85	0.00	0.00	2095.21	
,IB	107.00 EA	17,634	412	269,804	0	0	287,851	2690.19
Sgl Seat,Sprg Load Dir Act Diap								
M MIL PL 3" Twin Disc Type Check Valve		45.02	0.43	63.85	0.00	0.00	109.29	
IB Wafer Type- 125#	107.00 EA	6,184	59	8,772	0	0	15,015	140.33
MIL PL 3/4"x3/4"Brz Press Rlf Vlv, T		25.39	0.21	18.68	0.00	0.00	44.29	
hrd	107.00 EA	3,489	29	2,567	0	0	6,085	56.87
MIL PL Hyd Test,1000-2000LF, 1"-4" P		1537.18	13.69	0.00	0.00	0.00	1550.87	
ipe	2.00 EA	3,947	35	0	0	0	3,983	1991.27

2015.60. TREATMENT SYSTEM CONSTRUCTION	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL PL 1/2"Thread-O-Let,300# Forge S			31.66	0.74	2.70	0.00	0.00	35.10	
tl	500.00	EA	20,326	475	1,733	0	0	22,534	45.07
MIL PL 1"x1"Brz Press Relief Vlv, Th			33.86	0.28	43.73	0.00	0.00	77.87	
rd	214.00	EA	9,303	78	12,015	0	0	21,397	99.99
TOTAL LATERAL PIPING	1.00	JOB	256,521	3,589	366,264	0	0	626,374	626373.67
2015.60.15.15.15. WELLHEAD SPOOLS/FITTINGS									
USR AA Wellhead Spool			237.46	5.55	500.00	0.00	0.00	743.01	
	107.00	EA	25,408	594	53,500	0	0	79,502	743.01
TOTAL WELLHEAD SPOOLS/FITTINGS	1.00	JOB	25,408	594	53,500	0	0	79,502	79501.93
TOTAL STEAM INJECTION SYSTEM	1.00	JOB	377,243	5,679	447,558	0	0	830,480	830479.82
TOTAL PIPING	1.00	JOB	538,292	8,602	510,879	0	0	1,057,773	1057772.99
TOTAL TREATMENT SYSTEM CONSTRUCTION			559,153	28,633	559,543	1,889,300	58,134	3,094,763	
TOTAL HEAT YR3 STEP 3 & WELLS STEP	1.00	JOB	1,790,349	96,499	661,383	2,208,076	2,002,982	6,759,289	6759289.13

2016. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2016. HEAT YR1 STEP 4									
2016. 5. GENERAL CONDITIONS									
2016. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

2016. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2016.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2016.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2016.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2016.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2016.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	1000.00	0.00	0.00	1000.00	
	12.00 MO	0	0	12,000	0	0	12,000	1000.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	22,000	35,000	0	57,000	4750.00

2016.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2016.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU @ $3.50		0.00	0.00	0.00	0.00	3.50	3.50	
	505060 MBT	0	0	0	0	1,767,710	1,767,710	3.50
USR AA Electircity for Pumps, Treatment Plant, Steam: $60 per K KWH		0.00	0.00	0.00	0.00	60.00	60.00	
	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit		0.00	0.00	0.00	0.00	0.80	0.80	
	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge: 198.00/mon		0.00	0.00	0.00	0.00	198.00	198.00	
	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	2,198,870	2,198,870	183239.17
2016.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2016.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	29506 LB	0	0	29,506	0	0	29,506	1.00

2016.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	8874.00 LB	0	0	13,311	0	0	13,311	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	32833 LB	0	0	4,925	0	0	4,925	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	81640 LB	0	0	3,266	0	0	3,266	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	53244 LB	0	0	5,324	0	0	5,324	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	2662.00 LB	0	0	4,738	0	0	4,738	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	3550.00 LB	0	0	7,100	0	0	7,100	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	3550.00 LB	0	0	7,100	0	0	7,100	2.00
TOTAL CHEMICALS	12.00 MO	0	0	75,270	3,500	0	78,770	6564.19

2016.45. DISPOSALS

2016.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	177.00 CY	0	0	0	7,080	0	7,080	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	266.00 TON	0	0	0	15,960	0	15,960	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	23,040	0	26,040	2170.00

2016.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2016.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	8874.00 LBS	0	0	0	4,082	0	4,082	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	4,082	0	4,082	340.17
2016.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	29506 LBS	0	0	0	11,802	0	11,802	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	11,802	0	11,802	983.53
2016.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2016.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2016.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	48.00 MO	0	12,960	0	0	0	12,960	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	5.00 EA	0	0	250	0	0	250	50.00
USR AA Additional Labor for Recurring Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00

2016.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00	MO	0	12,960	250	2,500	0	15,710	1309.17
TOTAL DISPOSALS	12.00	MO	0	15,960	250	120,224	0	136,434	11369.54
2016.49. SAMPLING & ANALYSIS									
2016.49. 5. PERFORMANCE MONITORING									
2016.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	52.00	EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice			0.00	0.00	5.02	0.00	0.00	5.02	
	52.00	EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	304.16	0.00	0.00	304.16	
	14.00	EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)			0.00	0.00	0.00	55.00	0.00	55.00	
	58.00	EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)			0.00	0.00	0.00	155.00	0.00	155.00	
	14.00	EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00	MO	0	0	9,707	5,360	0	15,067	1255.61
2016.49. 5.10. SOIL SAMPLING (DRILL BACK)									
M HTW AA Total Petroleum Hydrocarbons (TPH)			0.00	0.00	0.00	87.00	0.00	87.00	
	52.00	EA	0	0	0	4,524	0	4,524	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)			0.00	0.00	0.00	161.00	0.00	161.00	
	52.00	EA	0	0	0	8,372	0	8,372	161.00
M AIR AA PCP/Semivolatile Organics (8270)			0.00	0.00	0.00	180.00	0.00	180.00	
	52.00	EA	0	0	0	9,360	0	9,360	180.00
USR AA Sampling Drilling Rig Mobe/Demobe			0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00	LS	0	0	0	3,000	0	3,000	3000.00

2016.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Drill Samples and Handle		0.00	0.00	0.00	34.00	0.00	34.00	
Cuttinigs, Regrout Holes	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geolog		59.40	0.00	0.00	0.00	0.00	59.40	
ist	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
office.	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	76,256	1,410	81,538	8153.80
TOTAL PERFORMANCE MONITORING	12.00 MO	3,872	0	9,707	81,616	1,410	96,605	8050.44
2016.49.10. COMPLIANCE MONITORING								
2016.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al	5.00 EA	0	25,000	0	0	0	25,000	5000.00
low								
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes	4.00 EA	0	0	3,700	0	0	3,700	925.00
Expenses & 10% Admin.								
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00

2016.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2016.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	
		0	0	0	7,700	0	7,700	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	
		0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	
		0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	
		0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	
		0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	
		0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	
		0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63
2016.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)	5.00 EA	0.00	0.00	950.00	0.00	0.00	950.00	
		0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	5.00 EA	0.00	0.00	0.00	203.00	0.00	203.00	
		0	0	0	1,015	0	1,015	203.00

2016.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2016.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

2016.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2016.49.10.25. SAMPLING TECHNICIANS

2016.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and
with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2016.49.10.25.10. GW MONITORING REPORT

USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50

2016.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	26,390	192,066	10,316	291,753	24312.75
2016.55. QC & ANALYTICAL DATA VALIDATION								
2016.55. 5. DATA VALIDATION								
2016.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2016.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2016.55. 5.15. AIR MONITORING SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	150.00 HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00 MO	8,910	0	0	0	0	8,910	742.50
2016.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2016.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR1 STEP 4	1.00	JOB	1,093,804	67,420	128,490	412,470	2,213,944	3,916,129	3916129.31

2017. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017. HEAT YR2 STEP 4								
2017. 5. GENERAL CONDITIONS								
2017. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2017. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2017.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2017.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2017.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2017.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	1000.00	0.00	0.00	1000.00	
	12.00 MO	0	0	12,000	0	0	12,000	1000.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	22,000	35,000	0	57,000	4750.00

2017.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU @ $3.50		0.00	0.00	0.00	0.00	3.50	3.50	
	353542 MBT	0	0	0	0	1,237,397	1,237,397	3.50
USR AA Electricity for Pumps, Treatment Plant, Steam: $60 per K KWH		0.00	0.00	0.00	0.00	60.00	60.00	
	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit		0.00	0.00	0.00	0.00	0.80	0.80	
	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge: 198.00/mon		0.00	0.00	0.00	0.00	198.00	198.00	
	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,668,557	1,668,557	139046.42
2017.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2017.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	29506 LB	0	0	29,506	0	0	29,506	1.00

2017.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)	8874.00 LB	0.00 0	0.00 0	1.50 13,311	0.00 0	0.00 0	1.50 13,311	1.50
USR AA Caustic	32833 LB	0.00 0	0.00 0	0.15 4,925	0.00 0	0.00 0	0.15 4,925	0.15
USR AA Shipping Caustic	2.00 EA	0.00 0	0.00 0	0.00 0	500.00 1,000	0.00 0	500.00 1,000	500.00
USR AA Shipping Acid	5.00 EA	0.00 0	0.00 0	0.00 0	500.00 2,500	0.00 0	500.00 2,500	500.00
USR AA Acid	81640 LB	0.00 0	0.00 0	0.04 3,266	0.00 0	0.00 0	0.04 3,266	0.04
USR AA Water Softener Salts	53244 LB	0.00 0	0.00 0	0.10 5,324	0.00 0	0.00 0	0.10 5,324	0.10
USR AA Polymer	2662.00 LB	0.00 0	0.00 0	1.78 4,738	0.00 0	0.00 0	1.78 4,738	1.78
USR AA Scale Inhibitor	3550.00 LB	0.00 0	0.00 0	2.00 7,100	0.00 0	0.00 0	2.00 7,100	2.00
USR AA Oxygen Scavenger	3550.00 LB	0.00 0	0.00 0	2.00 7,100	0.00 0	0.00 0	2.00 7,100	2.00
TOTAL CHEMICALS	12.00 MO	0	0	75,270	3,500	0	78,770	6564.19

2017.45. DISPOSALS

2017.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site	177.00 CY	0.00 0	0.00 0	0.00 0	40.00 7,080	0.00 0	40.00 7,080	40.00
USR AA Disposal of Sludge	266.00 TON	0.00 0	0.00 0	0.00 0	60.00 15,960	0.00 0	60.00 15,960	60.00
USR AA RO/RO Rental	12.00 MO	0.00 0	250.00 3,000	0.00 0	0.00 0	0.00 0	250.00 3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	23,040	0	26,040	2170.00

2017.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	8874.00 LBS	0	0	0	4,082	0	4,082	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	4,082	0	4,082	340.17
2017.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	29506 LBS	0	0	0	11,802	0	11,802	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	11,802	0	11,802	983.53
2017.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2017.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2017.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2017.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	118,724	0	131,424	10952.04
2017.49. SAMPLING & ANALYSIS								
2017.49. 5. PERFORMANCE MONITORING								
2017.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2017.49.10. COMPLIANCE MONITORING								
2017.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2017.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2017.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2017.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2017.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2017.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2017.49.10.25. SAMPLING TECHNICIANS

2017.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2017.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2017.55. QC & ANALYTICAL DATA VALIDATION								
2017.55. 5. DATA VALIDATION								
2017.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2017.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2017.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2017.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2017.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR2 STEP 4	1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31

2018. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018. HEAT YR3 STEP 4									
2018. 5. GENERAL CONDITIONS									
2018. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00	HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00	HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00	HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	144.00	HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00	HR	1,694	0	0	0	0	1,694	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00	HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00	HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00	HR	1,654	0	0	0	0	1,654	103.40
ana									
USR AA Principal Engineer/Scientist			91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00	HR	3,652	0	0	0	0	3,652	91.30
PCS Support									
USR AA Consultant			0.00	0.00	0.00	150.00	0.00	150.00	
	240.00	HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00	MI	0	0	0	0	930	930	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	4.00	DAY	0	0	0	0	168	168	42.00

2018. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2018.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2018.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2018.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2018.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	10000.00	0.00	0.00	10000.00	
	1.00 LS	0	0	10,000	0	0	10,000	10000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	1000.00	0.00	0.00	1000.00	
	12.00 MO	0	0	12,000	0	0	12,000	1000.00
USR AA Well Maintenance		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL MAINTENANCE	12.00 MO	0	0	22,000	35,000	0	57,000	4750.00

2018.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utilit								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Total Gas Requirements in MMB TU		0.00	0.00	0.00	0.00	3.50	3.50	
@ $3.50	353542 MBT	0	0	0	0	1,237,397	1,237,397	3.50
USR AA Electricity for Pumps, Treatment		0.00	0.00	0.00	0.00	60.00	60.00	
Plant, Steam: $60 per K KWH	6132.00 KKW	0	0	0	0	367,920	367,920	60.00
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	70080 UNT	0	0	0	0	56,064	56,064	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	1,668,557	1,668,557	139046.42
2018.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2018.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	29506 LB	0	0	29,506	0	0	29,506	1.00

2018.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA GAC (Air)		0.00	0.00	1.50	0.00	0.00	1.50	
	8874.00 LB	0	0	13,311	0	0	13,311	1.50
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	32833 LB	0	0	4,925	0	0	4,925	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	5.00 EA	0	0	0	2,500	0	2,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	81640 LB	0	0	3,266	0	0	3,266	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	53244 LB	0	0	5,324	0	0	5,324	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	2662.00 LB	0	0	4,738	0	0	4,738	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	3550.00 LB	0	0	7,100	0	0	7,100	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	3550.00 LB	0	0	7,100	0	0	7,100	2.00
TOTAL CHEMICALS	12.00 MO	0	0	75,270	3,500	0	78,770	6564.19

2018.45. DISPOSALS

2018.45. 5. SLUDGE

Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	177.00 CY	0	0	0	7,080	0	7,080	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	266.00 TON	0	0	0	15,960	0	15,960	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	23,040	0	26,040	2170.00

2018.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.45.10. CARBON (GAC, VAPOR PHASE) Assumes steam regeneration of GAC and disposal at Clean Harbors incinerator at Kimball, NE.								
USR AA Vapor Phase GAC Disposal		0.00	0.00	0.00	0.46	0.00	0.46	
	8874.00 LBS	0	0	0	4,082	0	4,082	0.46
TOTAL CARBON (GAC, VAPOR PHASE)	12.00 MO	0	0	0	4,082	0	4,082	340.17
2018.45.15. CARBON (GAC, LIQUID PHASE) Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.								
USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	29506 LBS	0	0	0	11,802	0	11,802	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	11,802	0	11,802	983.53
2018.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2018.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	40000 GAL	0	0	0	76,800	0	76,800	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	76,800	0	76,800	6400.00
2018.45.30. WASTE MISC COSTS								
USR AA Baker Tank Rental		0.00	800.00	0.00	0.00	0.00	800.00	
	12.00 MO	0	9,600	0	0	0	9,600	800.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	2.00 EA	0	0	100	0	0	100	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2018.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL WASTE MISC COSTS	12.00 MO	0	9,600	100	1,000	0	10,700	891.67
TOTAL DISPOSALS	12.00 MO	0	12,600	100	118,724	0	131,424	10952.04
2018.49. SAMPLING & ANALYSIS								
2018.49. 5. PERFORMANCE MONITORING								
2018.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment		0.00	0.00	99.00	0.00	0.00	99.00	
202 samples/8 per chest = 26 shipments	52.00 EA	0	0	5,148	0	0	5,148	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW8310)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2018.49.10. COMPLIANCE MONITORING								
2018.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Allow	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00

2018.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA Metals (air)		0.00	0.00	0.00	60.00	0.00	60.00	
	40.00 EA	0	0	0	2,400	0	2,400	60.00
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	20,600	0	51,900	4325.00
2018.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	55.00 EA	0.00	0.00	0.00	140.00	0.00	140.00	140.00
M AIR AA PCP/Semivolatile Organics (8270)	55.00 EA	0.00	0.00	0.00	155.00	0.00	155.00	155.00
M AIR AA TAL Metals (6010/7000s)	55.00 EA	0.00	0.00	0.00	40.00	0.00	40.00	40.00
M AIR AA Dioxins & Dibenzofurans (8290)	55.00 EA	0.00	0.00	0.00	950.00	0.00	950.00	950.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00	0.00	4.00	0.00	0.00	4.00	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	28.00 EA	0.00	0.00	99.00	0.00	0.00	99.00	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	28.00 EA	0.00	0.00	5.02	0.00	0.00	5.02	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	70,675	0	73,628	6135.63

2018.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Dioxins & Dibenzofurans (8280)		0.00	0.00	950.00	0.00	0.00	950.00	
	5.00 EA	0	0	4,750	0	0	4,750	950.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	203.00	0.00	203.00	
	5.00 EA	0	0	0	1,015	0	1,015	203.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	225.00	0.00	225.00	
	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	4.00 EA	0	0	396	0	0	396	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	8.00 EA	0	0	0	5,920	0	5,920	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	5,174	8,695	0	13,869	1155.76
2018.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW83 10)		0.00	0.00	0.00	140.00	0.00	140.00	
	14.00 EA	0	0	0	1,960	0	1,960	140.00
M AIR AA PCP/Semivolatile Organics (82 70)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00

2018.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290)		0.00	0.00	0.00	950.00	0.00	950.00	
	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	12.00 EA	0	0	1,188	0	0	1,188	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice		0.00	0.00	5.02	0.00	0.00	5.02	
	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2018.49.10.25. SAMPLING TECHNICIANS

2018.49.10.25. 5. SAMPLING GW WELLS
25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.

USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling Equipment/Materials		0.00	0.00	1000.00	0.00	0.00	1000.00	
	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50

2018.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	16,683	110,450	8,906	195,148	16262.31
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	26,390	115,810	8,906	210,215	17517.91
2018.55. QC & ANALYTICAL DATA VALIDATION								
2018.55. 5. DATA VALIDATION								
2018.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2018.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00

2018.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2018.55. 5.15. AIR MONITORING SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	150.00	HR	8,910	0	0	0	0	8,910	59.40
TOTAL AIR MONITORING SAMPLES	12.00	MO	8,910	0	0	0	0	8,910	742.50
2018.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	23,166	0	0	0	0	23,166	1930.50
TOTAL HEAT YR3 STEP 4	1.00	JOB	1,089,932	64,060	128,340	334,714	1,682,221	3,299,268	3299268.31

2019. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019. COOL DOWN YEAR 1								
2019. 5. GENERAL CONDITIONS								
2019. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2019. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2019.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2019.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2019.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2019.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

2019.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatment		0.00	0.00	0.00	0.00	60.00	60.00	
	3227.00 KKW	0	0	0	0	193,620	193,620	60.00
Plant: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	5164.00 UNT	0	0	0	0	4,131	4,131	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	204,927	204,927	17077.27
2019.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2019.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	5250.00 LB	0	0	5,250	0	0	5,250	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	27300 LB	0	0	4,095	0	0	4,095	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2019.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	67800 LB	0	0	2,712	0	0	2,712	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	44000 LB	0	0	4,400	0	0	4,400	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	2200.00 LB	0	0	3,916	0	0	3,916	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
TOTAL CHEMICALS	12.00 MO	0	0	31,973	2,500	0	34,473	2872.75

2019.45. DISPOSALS

2019.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	150.00 CY	0	0	0	6,000	0	6,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	225.00 TON	0	0	0	13,500	0	13,500	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	19,500	0	22,500	1875.00

2019.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	5250.00 LBS	0	0	0	2,100	0	2,100	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	2,100	0	2,100	175.00

2019.45. DISPOSALS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.									
USR AA Disposal Allowance			0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00	LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00	MO	0	0	0	2,000	0	2,000	166.67
2019.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.									
USR AA Oily Waste			0.00	0.00	0.00	1.92	0.00	1.92	
	63200	GAL	0	0	0	121,344	0	121,344	1.92
TOTAL OILY WASTE	12.00	MO	0	0	0	121,344	0	121,344	10112.00
2019.45.30. WASTE MISC COSTS									
USR AA RO/RO Rental			0.00	270.00	0.00	0.00	0.00	270.00	
	36.00	MO	0	9,720	0	0	0	9,720	270.00
USR AA Liners			0.00	0.00	50.00	0.00	0.00	50.00	
	4.00	EA	0	0	200	0	0	200	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling			0.00	0.00	0.00	500.00	0.00	500.00	
	4.00	EA	0	0	0	2,000	0	2,000	500.00
TOTAL WASTE MISC COSTS	12.00	MO	0	9,720	200	2,000	0	11,920	993.33
TOTAL DISPOSALS	12.00	MO	0	12,720	200	146,944	0	159,864	13322.00
2019.49. SAMPLING & ANALYSIS									
2019.49. 5. PERFORMANCE MONITORING									
2019.49. 5. 5. GWTP (PROCESS)									
AIR AA Packing Tape Per Roll			0.00	0.00	4.00	0.00	0.00	4.00	
	10.00	EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments			0.00	0.00	99.00	0.00	0.00	99.00	
	52.00	EA	0	0	5,148	0	0	5,148	99.00

2019.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2019.49.10. COMPLIANCE MONITORING								
2019.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00

2019.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
2019.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71
2019.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

2019.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
2019.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2019.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2019.49.10.25. SAMPLING TECHNICIANS								
2019.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2019.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20

2019.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83
2019.55. QC & ANALYTICAL DATA VALIDATION								
2019.55. 5. DATA VALIDATION								
2019.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2019.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2019.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	14,256	0	0	0	0	14,256	1188.00
2019.60. REMOVE/DEMO STEAM EQUIPMENT								
2019.60. 5. DEMOLITION/REMOVAL EQUIPMENT								
MIL AA Outside Equip. Operators, Med ium		56.51	0.00	0.00	0.00	0.00	56.51	
	80.00 HR	4,520	0	0	0	0	4,520	56.51
MIL AA Outside Laborers, (Semi-Skill ed)		38.39	0.00	0.00	0.00	0.00	38.39	
	320.00 HR	12,285	0	0	0	0	12,285	38.39

2019.60. REMOVE/DEMO STEAM EQUIPMENT	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
MIL AA Outside Plumbers			50.69	0.00	0.00	0.00	0.00	50.69	
	80.00	HR	4,055	0	0	0	0	4,055	50.69
MIL AA CRANE,HYD,TRK MTD, 4.5T/52'B OOM (ADD FLAT BED 43,000GVW TRUCK)			0.00	4.37	0.00	0.00	0.00	4.37	
	80.00	HR	0	350	0	0	0	350	4.37
TOTAL DEMOLITION/REMOVAL EQUIPMENT	1.00	JOB	20,860	350	0	0	0	21,210	21210.15
2019.60.10. DISPOSALS									
USR AA Disposal Misc Piping & Equipment, RCRA Landfill			0.00	0.00	0.00	100.00	0.00	100.00	
	100.00	TON	0	0	0	10,000	0	10,000	100.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	10,000	0	10,000	10000.00
TOTAL REMOVE/DEMO STEAM EQUIPMENT	12.00	MO	20,860	350	0	10,000	0	31,210	2600.85
TOTAL COOL DOWN YEAR 1	1.00	JOB	1,101,883	64,530	88,473	379,259	218,591	1,852,736	1852735.91

2020. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2020. COOL DOWN YEAR 2								
2020. 5. GENERAL CONDITIONS								
2020. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	500.00 HR	36,300	0	0	0	0	36,300	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	40.00 HR	2,376	0	0	0	0	2,376	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	144.00 HR	5,544	0	0	0	0	5,544	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	20.00 HR	1,694	0	0	0	0	1,694	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	40.00 HR	3,388	0	0	0	0	3,388	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	16.00 HR	1,654	0	0	0	0	1,654	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	16.00 HR	1,654	0	0	0	0	1,654	103.40
ana								
USR AA Principal Engineer/Scientist		91.30	0.00	0.00	0.00	0.00	91.30	
I -	40.00 HR	3,652	0	0	0	0	3,652	91.30
PCS Support								
USR AA Consultant		0.00	0.00	0.00	150.00	0.00	150.00	
	240.00 HR	0	0	0	36,000	0	36,000	150.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	3000.00 MI	0	0	0	0	930	930	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	4.00 DAY	0	0	0	0	168	168	42.00

2020. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2020.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2020.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2020.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2020.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2020.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

2020.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2020.30. UTILITIES								
Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements.								
Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements.								
Makeup water requirements.								
Costed at 0.80/750 gallon unit per local utility.								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatm		0.00	0.00	0.00	0.00	60.00	60.00	
ent	2227.00 KKW	0	0	0	0	133,620	133,620	60.00
Plant: $60 per K KWH								
USR AA Makeup Fresh Water, 750 Gal		0.00	0.00	0.00	0.00	0.80	0.80	
Units @ 0.80/Unit	5164.00 UNT	0	0	0	0	4,131	4,131	0.80
USR AA Water Meter Service Charge:		0.00	0.00	0.00	0.00	198.00	198.00	
198.00/mon	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	144,927	144,927	12077.27
2020.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2020.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	4750.00 LB	0	0	4,750	0	0	4,750	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	27300 LB	0	0	4,095	0	0	4,095	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00

2020.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	67800 LB	0	0	2,712	0	0	2,712	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	44000 LB	0	0	4,400	0	0	4,400	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	2200.00 LB	0	0	3,916	0	0	3,916	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
TOTAL CHEMICALS	12.00 MO	0	0	31,473	2,500	0	33,973	2831.08

2020.45. DISPOSALS

2020.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	150.00 CY	0	0	0	6,000	0	6,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	225.00 TON	0	0	0	13,500	0	13,500	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	19,500	0	22,500	1875.00

2020.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	5250.00 LBS	0	0	0	2,100	0	2,100	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	2,100	0	2,100	175.00

2020.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2020.45.20. PPE & MISC								
Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2020.45.25. OILY WASTE								
Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	63200 GAL	0	0	0	121,344	0	121,344	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	121,344	0	121,344	10112.00
2020.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	36.00 MO	0	9,720	0	0	0	9,720	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	4.00 EA	0	0	200	0	0	200	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,720	200	2,000	0	11,920	993.33
TOTAL DISPOSALS	12.00 MO	0	12,720	200	146,944	0	159,864	13322.00
2020.49. SAMPLING & ANALYSIS								
2020.49. 5. PERFORMANCE MONITORING								
2020.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00

2020.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2020.49.10. COMPLIANCE MONITORING								
2020.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00

2020.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
2020.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	28.00 EA	0	0	2,772	0	0	2,772	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71
2020.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

2020.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
2020.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2020.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2020.49.10.25. SAMPLING TECHNICIANS								
2020.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2020.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20

2020.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING TECHNICIANS	12.00	MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
TOTAL SAMPLING & ANALYSIS	12.00	MO	34,109	25,000	21,640	118,135	8,906	207,790	17315.83
2020.55. QC & ANALYTICAL DATA VALIDATION									
2020.55. 5. DATA VALIDATION									
2020.55. 5. 5. PROCESS SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00	MO	2,376	0	0	0	0	2,376	198.00
2020.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
2020.55. 5.20. MISC SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	100.00	HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00	MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	14,256	0	0	0	0	14,256	1188.00
TOTAL COOL DOWN YEAR 2	1.00	JOB	1,081,022	64,180	87,973	369,259	158,591	1,761,026	1761025.76

2021. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021. COOL DOWN YEAR 3								
2021. 5. GENERAL CONDITIONS								
2021. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist III; Program Mgr.	40.00 HR	103.40 4,136	0.00 0	0.00 0	0.00 0	0.00 0	103.40 4,136	103.40
USR AA Senior Engineer/Scientist II; O&M Project Manager	500.00 HR	72.60 36,300	0.00 0	0.00 0	0.00 0	0.00 0	72.60 36,300	72.60
USR AA Senior Engineer/Scientist II Purchaser	80.00 HR	72.60 5,808	0.00 0	0.00 0	0.00 0	0.00 0	72.60 5,808	72.60
USR AA Engineer/Scientist IV; Regulatory Specialist	40.00 HR	59.40 2,376	0.00 0	0.00 0	0.00 0	0.00 0	59.40 2,376	59.40
USR AA Secretary/Clerical IV	144.00 HR	38.50 5,544	0.00 0	0.00 0	0.00 0	0.00 0	38.50 5,544	38.50
USR AA Contractors Chem Quality Control Officer	20.00 HR	84.70 1,694	0.00 0	0.00 0	0.00 0	0.00 0	84.70 1,694	84.70
USR AA Senior Engineer/Scientist IV; Project Chemist	40.00 HR	84.70 3,388	0.00 0	0.00 0	0.00 0	0.00 0	84.70 3,388	84.70
USR AA Principal Engineer/Scientist III Health and Safety Manager (CIH)	16.00 HR	103.40 1,654	0.00 0	0.00 0	0.00 0	0.00 0	103.40 1,654	103.40
Assume one visit to site.								
USR AA Principal Engineer/Scientist III; Contractors CQC System Mana	16.00 HR	103.40 1,654	0.00 0	0.00 0	0.00 0	0.00 0	103.40 1,654	103.40
USR AA Principal Engineer/Scientist I - PCS Support	40.00 HR	91.30 3,652	0.00 0	0.00 0	0.00 0	0.00 0	91.30 3,652	91.30
USR AA Consultant	240.00 HR	0.00 0	0.00 0	0.00 0	150.00 36,000	0.00 0	150.00 36,000	150.00
USR AA Mileage on Personal Car	3000.00 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 930	0.31 930	0.31
USR AA M&IE	4.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	42.00 168	42.00 168	42.00

2021. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	60.00 EA	0	0	0	0	600	600	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	4.00 DAY	0	0	0	0	180	180	45.00
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
TOTAL GENERAL CONDITIONS	12.00 MO	66,207	0	0	36,000	1,878	104,085	8673.73
2021.10. SITE FACILITIES								
USR AA Fax Machine		0.00	75.00	0.00	0.00	0.00	75.00	
	12.00 MO	0	900	0	0	0	900	75.00
USR AA Copy Machine Service		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Pump Waste Tank		0.00	0.00	0.00	50.00	0.00	50.00	
	12.00 MO	0	0	0	600	0	600	50.00
USR AA Bottled Water		0.00	0.00	0.00	0.00	40.00	40.00	
	12.00 MO	0	0	0	0	480	480	40.00
USR AA Trash Removal		0.00	0.00	0.00	40.00	0.00	40.00	
	12.00 MO	0	0	0	480	0	480	40.00
USR AA Computer Rental		0.00	80.00	0.00	0.00	0.00	80.00	
	12.00 MO	0	960	0	0	0	960	80.00
USR AA Fork Lift Rental		0.00	1300.00	0.00	0.00	200.00	1500.00	
	12.00 MO	0	15,600	0	0	2,400	18,000	1500.00
USR AA Electrician and Mechanical Support		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Instrument Technician		0.00	0.00	0.00	1000.00	0.00	1000.00	
	12.00 MO	0	0	0	12,000	0	12,000	1000.00
USR AA Refrigerator		0.00	0.00	500.00	0.00	0.00	500.00	
	1.00 LS	0	0	500	0	0	500	500.00
TOTAL SITE FACILITIES	12.00 MO	0	17,460	500	25,680	2,880	46,520	3876.67

2021.15. HEALTH & SAFETY	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021.15. HEALTH & SAFETY								
USR AA OVM		0.00	450.00	0.00	0.00	0.00	450.00	
	12.00 MO	0	5,400	0	0	0	5,400	450.00
USR AA CGI		0.00	200.00	0.00	0.00	0.00	200.00	
	12.00 MO	0	2,400	0	0	0	2,400	200.00
USR AA Water Level Meter		0.00	100.00	0.00	0.00	0.00	100.00	
	12.00 MO	0	1,200	0	0	0	1,200	100.00
USR AA PPE		0.00	0.00	40.00	0.00	0.00	40.00	
	12.00 MO	0	0	480	0	0	480	40.00
TOTAL HEALTH & SAFETY	12.00 MO	0	9,000	480	0	0	9,480	790.00
2021.20. MATERIALS & SUPPLIES								
USR AA Office Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Uniforms/Work Clothes		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
USR AA Routine Maintenance Supplies		0.00	0.00	100.00	0.00	0.00	100.00	
	12.00 MO	0	0	1,200	0	0	1,200	100.00
TOTAL MATERIALS & SUPPLIES	12.00 MO	0	0	3,600	0	0	3,600	300.00
2021.25. MAINTENANCE								
USR AA PLC Support		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
USR AA Spare Parts		0.00	0.00	20000.00	0.00	0.00	20000.00	
	1.00 LS	0	0	20,000	0	0	20,000	20000.00
USR AA Well Redevelopment		0.00	0.00	0.00	20000.00	0.00	20000.00	
	1.00 LS	0	0	0	20,000	0	20,000	20000.00
USR AA Spare Parts/Maintenance		0.00	0.00	840.00	0.00	0.00	840.00	
	12.00 MO	0	0	10,080	0	0	10,080	840.00
USR AA Well Maintenance		0.00	0.00	0.00	10000.00	0.00	10000.00	
	1.00 LS	0	0	0	10,000	0	10,000	10000.00
TOTAL MAINTENANCE	12.00 MO	0	0	30,080	40,000	0	70,080	5840.00

2021.30. UTILITIES	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021.30. UTILITIES Gas requirements assuming gas at $3.50/MCFT. See Table 4.6.1 of text for calculated requirements. Electricity for the pumps, and other motors, lights, etc as calculated. Assume 0.060/KWH for cost. See Table 4.6.1 of text for calculated requirements. Makeup water requirements. Costed at 0.80/750 gallon unit per local utility.								
USR AA Telephone & Beepers		0.00	0.00	0.00	0.00	400.00	400.00	
	12.00 MO	0	0	0	0	4,800	4,800	400.00
USR AA Electricity for Pumps, Treatm ent Plant, Steam: $60 per K KWH		0.00	0.00	0.00	0.00	60.00	60.00	
	2227.00 KKW	0	0	0	0	133,620	133,620	60.00
USR AA Makeup Fresh Water, 750 Gal Units @ 0.80/Unit		0.00	0.00	0.00	0.00	0.80	0.80	
	5164.00 UNT	0	0	0	0	4,131	4,131	0.80
USR AA Water Meter Service Charge: 198.00/mon		0.00	0.00	0.00	0.00	198.00	198.00	
	12.00 MO	0	0	0	0	2,376	2,376	198.00
TOTAL UTILITIES	12.00 MO	0	0	0	0	144,927	144,927	12077.27
2021.35. SITE O&M LABOR & MISC EQUIPMENT								
USR AA GWTP Plant Manager		53.13	0.00	0.00	0.00	0.00	53.13	
	8670.00 HR	460,637	0	0	0	0	460,637	53.13
USR AA Engineer/Scientist IV		43.47	0.00	0.00	0.00	0.00	43.47	
	8670.00 HR	376,885	0	0	0	0	376,885	43.47
USR AA Senior Engineer/SCientist IV		61.99	0.00	0.00	0.00	0.00	61.99	
	2080.00 HR	128,929	0	0	0	0	128,929	61.99
TOTAL SITE O&M LABOR & MISC EQUIPME	12.00 MO	966,451	0	0	0	0	966,451	80537.57
2021.40. CHEMICALS								
USR AA GAC (Liquid)		0.00	0.00	1.00	0.00	0.00	1.00	
	2375.00 LB	0	0	2,375	0	0	2,375	1.00
USR AA Caustic		0.00	0.00	0.15	0.00	0.00	0.15	
	27300 LB	0	0	4,095	0	0	4,095	0.15
USR AA Shipping Caustic		0.00	0.00	0.00	500.00	0.00	500.00	
	2.00 EA	0	0	0	1,000	0	1,000	500.00
USR AA Shipping Acid		0.00	0.00	0.00	500.00	0.00	500.00	
	3.00 EA	0	0	0	1,500	0	1,500	500.00

2021.40. CHEMICALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Acid		0.00	0.00	0.04	0.00	0.00	0.04	
	67800 LB	0	0	2,712	0	0	2,712	0.04
USR AA Water Softener Salts		0.00	0.00	0.10	0.00	0.00	0.10	
	44000 LB	0	0	4,400	0	0	4,400	0.10
USR AA Polymer		0.00	0.00	1.78	0.00	0.00	1.78	
	2200.00 LB	0	0	3,916	0	0	3,916	1.78
USR AA Scale Inhibitor		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
USR AA Oxygen Scavenger		0.00	0.00	2.00	0.00	0.00	2.00	
	2900.00 LB	0	0	5,800	0	0	5,800	2.00
TOTAL CHEMICALS	12.00 MO	0	0	29,098	2,500	0	31,598	2633.17

2021.45. DISPOSALS

2021.45. 5. SLUDGE
Sludge assumed to be disposed at a regional (CA) RCRA landfill.

USR AA Transport Sludge to Disposal Site		0.00	0.00	0.00	40.00	0.00	40.00	
	150.00 CY	0	0	0	6,000	0	6,000	40.00
USR AA Disposal of Sludge		0.00	0.00	0.00	60.00	0.00	60.00	
	225.00 TON	0	0	0	13,500	0	13,500	60.00
USR AA RO/RO Rental		0.00	250.00	0.00	0.00	0.00	250.00	
	12.00 MO	0	3,000	0	0	0	3,000	250.00
TOTAL SLUDGE	12.00 MO	0	3,000	0	19,500	0	22,500	1875.00

2021.45.15. CARBON (GAC, LIQUID PHASE)
Assumes steam regeneration of GAC and disposal when exhausted at Clean Harbors incinerator at Kimball, NE.

USR AA Liquid Phase GAC Disposal		0.00	0.00	0.00	0.40	0.00	0.40	
	2735.00 LBS	0	0	0	1,094	0	1,094	0.40
TOTAL CARBON (GAC, LIQUID PHASE)	12.00 MO	0	0	0	1,094	0	1,094	91.17

2021.45. DISPOSALS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021.45.20. PPE & MISC Assumed disposed at local or regional RCRA landfill.								
USR AA Disposal Allowance		0.00	0.00	0.00	2000.00	0.00	2000.00	
	1.00 LS	0	0	0	2,000	0	2,000	2000.00
TOTAL PPE & MISC	12.00 MO	0	0	0	2,000	0	2,000	166.67
2021.45.25. OILY WASTE Disposal quantity per year is assumed to be constant over the 7 years of extraction even though quantities would be greater in the earlier years and taper off toward the 7th year. Total of 600,000 gallons of NAPL's assumed removed for Scenario 1.								
USR AA Oily Waste		0.00	0.00	0.00	1.92	0.00	1.92	
	63200 GAL	0	0	0	121,344	0	121,344	1.92
TOTAL OILY WASTE	12.00 MO	0	0	0	121,344	0	121,344	10112.00
2021.45.30. WASTE MISC COSTS								
USR AA RO/RO Rental		0.00	270.00	0.00	0.00	0.00	270.00	
	36.00 MO	0	9,720	0	0	0	9,720	270.00
USR AA Liners		0.00	0.00	50.00	0.00	0.00	50.00	
	4.00 EA	0	0	200	0	0	200	50.00
USR AA Additional Labor for Recurrin g Loadouts & Waste Handling		0.00	0.00	0.00	500.00	0.00	500.00	
	4.00 EA	0	0	0	2,000	0	2,000	500.00
TOTAL WASTE MISC COSTS	12.00 MO	0	9,720	200	2,000	0	11,920	993.33
TOTAL DISPOSALS	12.00 MO	0	12,720	200	145,938	0	158,858	13238.17
2021.49. SAMPLING & ANALYSIS								
2021.49. 5. PERFORMANCE MONITORING								
2021.49. 5. 5. GWTP (PROCESS)								
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments		0.00	0.00	99.00	0.00	0.00	99.00	
	52.00 EA	0	0	5,148	0	0	5,148	99.00

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	52.00 EA	0	0	261	0	0	261	5.02
AIR AA Polynuclear Aromatic		0.00	0.00	304.16	0.00	0.00	304.16	
Hydrocarbons, PAH(SW3510/SW83 10)	14.00 EA	0	0	4,258	0	0	4,258	304.16
USR AA TOC (9060)		0.00	0.00	0.00	55.00	0.00	55.00	
	58.00 EA	0	0	0	3,190	0	3,190	55.00
USR AA PCP (8270 mod)		0.00	0.00	0.00	155.00	0.00	155.00	
	14.00 EA	0	0	0	2,170	0	2,170	155.00
TOTAL GWTP (PROCESS)	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
TOTAL PERFORMANCE MONITORING	12.00 MO	0	0	9,707	5,360	0	15,067	1255.61
2021.49.10. COMPLIANCE MONITORING								
2021.49.10. 5. FUGITIVE EMISSIONS								
USR AA Air Monitoring Stations,		0.00	5000.00	0.00	0.00	0.00	5000.00	
Sampling Equipment, Yearly Al low	5.00 EA	0	25,000	0	0	0	25,000	5000.00
RAD AA Calibration Engineer At Site		0.00	0.00	925.00	0.00	0.00	925.00	
Cost Per Each Day, Excludes Expenses & 10% Admin.	4.00 EA	0	0	3,700	0	0	3,700	925.00
USR AA Calibration Gasses		0.00	0.00	200.00	0.00	0.00	200.00	
	1.00 LS	0	0	200	0	0	200	200.00
USR AA Tedlar Bags		0.00	0.00	200.00	0.00	0.00	200.00	
	12.00 MO	0	0	2,400	0	0	2,400	200.00
USR AA PAH (air)		0.00	0.00	0.00	220.00	0.00	220.00	
	40.00 EA	0	0	0	8,800	0	8,800	220.00
USR AA PCP (air)		0.00	0.00	0.00	200.00	0.00	200.00	
	40.00 EA	0	0	0	8,000	0	8,000	200.00
USR AA PM10 (air)		0.00	0.00	0.00	35.00	0.00	35.00	
	40.00 EA	0	0	0	1,400	0	1,400	35.00
USR AA CO2/CO		0.00	0.00	0.00	115.00	0.00	115.00	
	40.00 EA	0	0	0	4,600	0	4,600	115.00
USR AA SOx & NO2		0.00	0.00	0.00	150.00	0.00	150.00	
	40.00 EA	0	0	0	6,000	0	6,000	150.00

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL FUGITIVE EMISSIONS	12.00 MO	0	25,000	6,300	28,800	0	60,100	5008.33
2021.49.10.10. PERIMETER MONITORING WELLS								
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	55.00 EA	0	0	0	4,785	0	4,785	87.00
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	55.00 EA	0	0	0	8,525	0	8,525	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	55.00 EA	0	0	0	2,200	0	2,200	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	55.00 EA	0	0	0	52,250	0	52,250	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	10.00 EA	0	0	40	0	0	40	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest shipments	28.00 EA	0	0	2,772	0	0	2,772	99.00
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	28.00 EA	0	0	141	0	0	141	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	2,953	67,760	0	70,713	5892.71
2021.49.10.15. WASTE DISPOSAL CHARACTERIZATION								
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	203.00	0.00	203.00	
Hydrocarbons, PAH(SW3510/SW83	5.00 EA	0	0	0	1,015	0	1,015	203.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	225.00	0.00	225.00	
70)	5.00 EA	0	0	0	1,125	0	1,125	225.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	5.00 EA	0	0	0	200	0	200	40.00
USR AA TPH		0.00	0.00	0.00	87.00	0.00	87.00	
	5.00 EA	0	0	0	435	0	435	87.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per	4.00 EA	0	0	396	0	0	396	99.00
chest								
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	4.00 EA	0	0	20	0	0	20	5.02
USR AA TCLP (As, Cr, SVOC)		0.00	0.00	0.00	740.00	0.00	740.00	
	4.00 EA	0	0	0	2,960	0	2,960	740.00
TOTAL WASTE DISPOSAL CHARACTERIZATI	12.00 MO	0	0	424	5,735	0	6,159	513.26
2021.49.10.20. GWTP DISCHARGE TO REINJECT WELLS								
USR AA TPH		0.00	0.00	0.00	60.00	0.00	60.00	
	14.00 EA	0	0	0	840	0	840	60.00
M AIR AA Polynuclear Aromatic		0.00	0.00	0.00	140.00	0.00	140.00	
Hydrocarbons, PAH(SW3510/SW83	14.00 EA	0	0	0	1,960	0	1,960	140.00
10)								
M AIR AA PCP/Semivolatile Organics (82		0.00	0.00	0.00	155.00	0.00	155.00	
70)	14.00 EA	0	0	0	2,170	0	2,170	155.00
M AIR AA TAL Metals (6010/7000s)		0.00	0.00	0.00	40.00	0.00	40.00	
	14.00 EA	0	0	0	560	0	560	40.00
M AIR AA Dioxins & Dibenzofurans (8290		0.00	0.00	0.00	950.00	0.00	950.00	
)	5.00 EA	0	0	0	4,750	0	4,750	950.00
AIR AA Packing Tape Per Roll		0.00	0.00	4.00	0.00	0.00	4.00	
	2.00 EA	0	0	8	0	0	8	4.00
HTW AA Overnight Shipment samples/8		0.00	0.00	99.00	0.00	0.00	99.00	
per chest	12.00 EA	0	0	1,188	0	0	1,188	99.00
shipments								
HTW AA Blue Ice Soft Packs		0.00	0.00	5.02	0.00	0.00	5.02	
Equivalent To 4 Lbs Of Ice	12.00 EA	0	0	60	0	0	60	5.02
TOTAL GWTP DISCHARGE TO REINJECT WE	12.00 MO	0	0	1,256	10,280	0	11,536	961.35

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021.49.10.25. SAMPLING TECHNICIANS								
2021.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	160.00 HR	9,504	0	0	0	0	9,504	59.40
USR AA Technician/Analyst IV		33.00	0.00	0.00	0.00	0.00	33.00	
	160.00 HR	5,280	0	0	0	0	5,280	33.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging		0.00	0.00	0.00	0.00	198.00	198.00	
Mgr and HSO.	28.00 DAY	0	0	0	0	5,544	5,544	198.00
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2021.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	25,000	11,933	112,775	8,906	192,723	16060.22
2021.49.15. CONFIRMATIONAL SAMPLING								
2021.49.15.10. SOIL SAMPLING (DRILL BACK)								
M HTW AA NAPL Mobility		0.00	0.00	0.00	200.00	0.00	200.00	
	11.00 EA	0	0	0	2,200	0	2,200	200.00
M HTW AA Total Petroleum Hydrocarbons (TPH)		0.00	0.00	0.00	87.00	0.00	87.00	
	11.00 EA	0	0	0	957	0	957	87.00
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)		0.00	0.00	0.00	161.00	0.00	161.00	
	11.00 EA	0	0	0	1,771	0	1,771	161.00
M AIR AA PCP/Semivolatile Organics (8270)		0.00	0.00	0.00	180.00	0.00	180.00	
	11.00 EA	0	0	0	1,980	0	1,980	180.00
USR AA Sampling Drilling Rig Mobe/Demobe		0.00	0.00	0.00	3000.00	0.00	3000.00	
	1.00 LS	0	0	0	3,000	0	3,000	3000.00
USR AA Drill Samples and Handle Cuttinigs, Regrout Holes		0.00	0.00	0.00	34.00	0.00	34.00	
	1500.00 LFT	0	0	0	51,000	0	51,000	34.00
USR AA Engineer/Scientist IV, Geologist		59.40	0.00	0.00	0.00	0.00	59.40	
	60.00 HR	3,564	0	0	0	0	3,564	59.40
USR AA Mileage on Personal Car office.		0.00	0.00	0.00	0.00	0.31	0.31	
	600.00 MI	0	0	0	0	186	186	0.31
USR AA Lodging Mgr and HSO.		0.00	0.00	0.00	0.00	198.00	198.00	
	5.00 DAY	0	0	0	0	990	990	198.00
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	8.00 HR	308	0	0	0	0	308	38.50
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	5.00 DAY	0	0	0	0	210	210	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	12.00	12.00	
	2.00 EA	0	0	0	0	24	24	12.00
TOTAL SOIL SAMPLING (DRILL BACK)	10.00 EA	3,872	0	0	60,908	1,410	66,190	6619.00

2021.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2021.49.15.15. LIF SURVEY								
USR AA LIF Survey/Report		0.00	0.00	0.00	5000.00	0.00	5000.00	
	1.00 LS	0	0	0	5,000	0	5,000	5000.00
TOTAL LIF SURVEY		0	0	0	5,000	0	5,000	
TOTAL CONFIRMATIONAL SAMPLING		3,872	0	0	65,908	1,410	71,190	
TOTAL SAMPLING & ANALYSIS	12.00 MO	37,981	25,000	21,640	184,043	10,316	278,980	23248.33
2021.55. QC & ANALYTICAL DATA VALIDATION								
2021.55. 5. DATA VALIDATION								
2021.55. 5. 5. PROCESS SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL PROCESS SAMPLES	12.00 MO	2,376	0	0	0	0	2,376	198.00
2021.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MONITORING WELL SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
2021.55. 5.20. MISC SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	100.00 HR	5,940	0	0	0	0	5,940	59.40
TOTAL MISC SAMPLES	12.00 MO	5,940	0	0	0	0	5,940	495.00
TOTAL DATA VALIDATION	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	14,256	0	0	0	0	14,256	1188.00
TOTAL COOL DOWN YEAR 3	1.00 JOB	1,084,894	64,180	85,598	434,161	160,001	1,828,835	1828834.76

2022. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2022. O&M MON WELLS & DEMO TREAT SYS.								
2022. 5. GENERAL CONDITIONS								
2022. 5.05. OFFSITE ADMINISTRATIVE COSTS								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	8.00 HR	827	0	0	0	0	827	103.40
USR AA Senior Engineer/Scientist II;		72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00 HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	4.00 HR	290	0	0	0	0	290	72.60
USR AA Engineer/Scientist IV;		59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	4.00 HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	4.00 HR	154	0	0	0	0	154	38.50
USR AA Contractors Chem Quality Cont		84.70	0.00	0.00	0.00	0.00	84.70	
rol	4.00 HR	339	0	0	0	0	339	84.70
Officer								
USR AA Senior Engineer/Scientist IV;		84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00 HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	4.00 HR	414	0	0	0	0	414	103.40
Health and Safety Manager								
(CIH)								
Assume one visit to site.								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	2.00 HR	207	0	0	0	0	207	103.40
ana								
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.31	0.31	
	400.00 MI	0	0	0	0	124	124	0.31
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	2.00 DAY	0	0	0	0	84	84	42.00
USR AA Tolls		0.00	0.00	0.00	0.00	10.00	10.00	
	2.00 EA	0	0	0	0	20	20	10.00
USR AA Rental Car		0.00	0.00	0.00	0.00	45.00	45.00	
	2.00 DAY	0	0	0	0	90	90	45.00

2022. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	5,711	0	0	0	318	6,029	502.43
TOTAL GENERAL CONDITIONS	12.00 MO	5,711	0	0	0	318	6,029	502.43
2022.49. SAMPLING & ANALYSIS								
2022.49.10. COMPLIANCE MONITORING								
2022.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	138.00 EA	0.00 0	0.00 0	0.00 0	140.00 19,320	0.00 0	140.00 19,320	140.00
M AIR AA PCP/Semivolatile Organics (8270)	138.00 EA	0.00 0	0.00 0	0.00 0	155.00 21,390	0.00 0	155.00 21,390	155.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00 0	0.00 0	4.00 40	0.00 0	0.00 0	4.00 40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	18.00 EA	0.00 0	0.00 0	99.00 1,782	0.00 0	0.00 0	99.00 1,782	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	18.00 EA	0.00 0	0.00 0	5.02 90	0.00 0	0.00 0	5.02 90	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	1,912	40,710	0	42,622	3551.86
2022.49.10.25. SAMPLING TECHNICIANS								
2022.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV	160.00 HR	59.40 9,504	0.00 0	0.00 0	0.00 0	0.00 0	59.40 9,504	59.40
USR AA Technician/Analyst IV	160.00 HR	33.00 5,280	0.00 0	0.00 0	0.00 0	0.00 0	33.00 5,280	33.00
USR AA Mileage on Personal Car	600.00 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 186	0.31 186	0.31
USR AA Lodging Mgr and HSO.	28.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	198.00 5,544	198.00 5,544	198.00

2022.49. SAMPLING & ANALYSIS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE		0.00	0.00	0.00	0.00	42.00	42.00	
	28.00 DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling		0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00 LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00 QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2022.49.10.25.10. GW MONITORING REPORT								
USR AA Senior Engineer/Scientist I		67.10	0.00	0.00	0.00	0.00	67.10	
	160.00 HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II		72.60	0.00	0.00	0.00	0.00	72.60	
	80.00 HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI		48.40	0.00	0.00	0.00	0.00	48.40	
	32.00 HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
	32.00 HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy		0.00	0.00	0.00	0.00	50.00	50.00	
	40.00 EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail		0.00	0.00	0.00	50.00	0.00	50.00	
	4.00 EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00 QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00 MO	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
TOTAL SAMPLING & ANALYSIS	12.00 MO	34,109	0	2,912	40,910	8,906	86,837	7236.43
2022.55. QC & ANALYTICAL DATA VALIDATION								
2022.55. 5. DATA VALIDATION								
2022.55. 5.10. MONITORING WELL SAMPLES								
USR AA Engineer/Scientist IV		59.40	0.00	0.00	0.00	0.00	59.40	
	40.00 HR	2,376	0	0	0	0	2,376	59.40
TOTAL MONITORING WELL SAMPLES	1.00 YR	2,376	0	0	0	0	2,376	2376.00

2022.55. QC & ANALYTICAL DATA VALIDATI	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL DATA VALIDATION	12.00 MO	2,376	0	0	0	0	2,376	198.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00 MO	2,376	0	0	0	0	2,376	198.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM

2022.60.02. GENERAL CONDITIONS

2022.60.02.01. FIELD SUPERVISION & MANAGEMENT

Assume 18 months construction in the field after contract awarded, NTP, and work plans produced and approved, and purchasing of equipment. Total duration of project construction before startup including field and office preparation is assumed at 24 months.

USR AA Prin. Engineer/Scientist I,		66.82	0.00	0.00	0.00	0.00	66.82	
Project Manager	200.00 HR	13,363	0	0	0	0	13,363	66.82
USR AA Site Superintendant		53.13	0.00	0.00	0.00	0.00	53.13	
	1000.00 HR	53,130	0	0	0	0	53,130	53.13
USR AA Secretary/Clerical II		19.32	0.00	0.00	0.00	0.00	19.32	
	1000.00 HR	19,320	0	0	0	0	19,320	19.32
USR AA Health & Safety Officer (HSO)		37.03	0.00	0.00	0.00	0.00	37.03	
	1000.00 HR	37,030	0	0	0	0	37,030	37.03
UPB AA TRK,HWY, 8,600GVW,4X2, 3/4T-P		0.00	5.50	0.00	0.00	0.00	5.50	
KUP	2000.00 HR	0	11,000	0	0	0	11,000	5.50
REF. EP 1110-1-8 4X2 3/4-TON								
USR AA Lodging;		0.00	0.00	0.00	0.00	1000.00	1000.00	
	6.00 MO	0	0	0	0	6,000	6,000	1000.00
USR AA M&IE		0.00	0.00	0.00	0.00	28.50	28.50	
	260.00 DAY	0	0	0	0	7,410	7,410	28.50
USR AA Airfare		0.00	0.00	0.00	0.00	500.00	500.00	
	12.00 EA	0	0	0	0	6,000	6,000	500.00
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	12.00 EA	0	0	0	0	240	240	20.00
USR AA Mileage on Personal Car		0.00	0.00	0.00	0.00	0.35	0.35	
	10000 MI	0	0	0	0	3,500	3,500	0.35
TOTAL FIELD SUPERVISION & MANAGEMEN	1.00 JOB	122,843	11,000	0	0	23,150	156,993	156993.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2022.60.02.02. ADMINISTRATION HOME OFFICE Scheduler, also serves in cost control. Average 20 hrs/wk.								
USR AA Program Manager.		103.40	0.00	0.00	0.00	0.00	103.40	
	40.00 HR	4,136	0	0	0	0	4,136	103.40
USR AA Prin. Engineer/Scientist I;		91.30	0.00	0.00	0.00	0.00	91.30	
Project Manager	200.00 HR	18,260	0	0	0	0	18,260	91.30
USR AA Secretary/Clerical IV		38.50	0.00	0.00	0.00	0.00	38.50	
Home office Secretarial Help	400.00 HR	15,400	0	0	0	0	15,400	38.50
USR AA Engineer/Scientist IV -		59.40	0.00	0.00	0.00	0.00	59.40	
Scheduler & Cost Control	520.00 HR	30,888	0	0	0	0	30,888	59.40
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III	40.00 HR	4,136	0	0	0	0	4,136	103.40
Health and Safety Manager								
USR AA Principal Engineer/Scientist		103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	40.00 HR	4,136	0	0	0	0	4,136	103.40
gr								
USR AA Mileage on Personal Car Pjm		0.00	0.00	0.00	0.00	0.31	0.31	
Weekly visit to site = 104 wk	10000 MI	0	0	0	0	3,100	3,100	0.31
s*								
USR AA Lodging; three mo for PjM plu		0.00	0.00	0.00	0.00	80.00	80.00	
s	10.00 DAY	0	0	0	0	800	800	80.00
additional visits during								
USR AA M&IE		0.00	0.00	0.00	0.00	38.00	38.00	
	10.00 DAY	0	0	0	0	380	380	38.00
USR AA Airfare Trips for HSM, QCSyst		0.00	0.00	0.00	0.00	500.00	500.00	
ems	2.00 EA	0	0	0	0	1,000	1,000	500.00
Mngr,								
USR AA Rental Car HSM visits (4) and		0.00	0.00	0.00	0.00	45.00	45.00	
2	6.00 DAY	0	0	0	0	270	270	45.00
visits by QC Systems Mgr.								
USR AA Parking/Taxi		0.00	0.00	0.00	0.00	20.00	20.00	
	6.00 EA	0	0	0	0	120	120	20.00
TOTAL ADMINISTRATION HOME OFFICE	1.00 JOB	76,956	0	0	0	5,670	82,626	82626.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2022.60.02.03. PURCHASING									
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Secretary/Clerical IV Home			38.50	0.00	0.00	0.00	0.00	38.50	
office Secretarial Help	16.00	HR	616	0	0	0	0	616	38.50
TOTAL PURCHASING	1.00	JOB	3,520	0	0	0	0	3,520	3520.00
2022.60.02.06. FIRST AID, FIRE, TRAFFIC, SECUR									
MIL AA 20#(9Kg)_Dry Chem Extgr,Red S			56.01	0.49	58.74	0.00	0.00	115.24	
t	20.00	EA	1,120	10	1,175	0	0	2,305	115.24
HTW AA Emergency Body Shower			145.11	1.22	122.86	0.00	0.00	269.19	
Assumes Std Hook-Up. No	1.00	EA	145	1	123	0	0	269	269.19
Additional Copper Piping Etc.									
HTW AA Eye Wash Bowl			126.97	1.07	165.17	0.00	0.00	293.21	
Assumes Std Hook-Up. No	4.00	EA	508	4	661	0	0	1,173	293.21
Additional Copper Piping Etc.									
HTW AA First Aid Kit			0.00	0.00	75.00	0.00	0.00	75.00	
	16.00	EA	0	0	1,200	0	0	1,200	75.00
USR AA Stretcher			0.00	0.00	150.00	0.00	0.00	150.00	
	2.00	EA	0	0	300	0	0	300	150.00
TOTAL FIRST AID, FIRE, TRAFFIC, SEC	1.00	JOB	1,773	15	3,458	0	0	5,247	5246.78
2022.60.02.07. HEALTH & SAFETY									
USR AA Decon Misc Items			0.00	0.00	500.00	0.00	0.00	500.00	
	1.00	LS	0	0	500	0	0	500	500.00
USR AA Level C PPE			0.00	0.00	41.00	0.00	0.00	41.00	
	40.00	DAY	0	0	1,640	0	0	1,640	41.00
USR AA Level D (Mod) PPE			0.00	0.00	12.00	0.00	0.00	12.00	
	520.00	DAY	0	0	6,240	0	0	6,240	12.00
USR AA Install/Decon Personnel Decon			192.45	0.85	250.00	0.00	0.00	443.30	
Area	1.00	LS	192	1	250	0	0	443	443.30
USR AA Photo Ionization Detector			0.00	800.00	0.00	0.00	0.00	800.00	
	6.00	MO	0	4,800	0	0	0	4,800	800.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Calibration Gasses		0.00	0.00	550.00	0.00	0.00	550.00	
	1.00 LS	0	0	550	0	0	550	550.00
USR AA LEL		0.00	350.00	0.00	0.00	0.00	350.00	
	6.00 MO	0	2,100	0	0	0	2,100	350.00
USR AA Miniram		0.00	425.00	0.00	0.00	0.00	425.00	
	6.00 MO	0	2,550	0	0	0	2,550	425.00
USR AA Labor Allowance for Site Specific Training		120.00	0.00	0.00	0.00	0.00	120.00	
	10.00 EA	1,200	0	0	0	0	1,200	120.00
USR AA Labor Allowance for Physicals		200.00	0.00	0.00	0.00	0.00	200.00	
	10.00 EA	2,000	0	0	0	0	2,000	200.00
USR AA Physicals		0.00	0.00	0.00	350.00	0.00	350.00	
	10.00 EA	0	0	0	3,500	0	3,500	350.00
TOTAL HEALTH & SAFETY	1.00 JOB	3,392	9,451	9,180	3,500	0	25,523	25523.30
2022.60.02.09. TEMP CONSTRUCTION FACILITIES								
USR AA Fax Machine		0.00	0.00	300.00	0.00	0.00	300.00	
	1.00 EA	0	0	300	0	0	300	300.00
USR AA Office Drinking Water Service		0.00	0.00	0.00	0.00	75.00	75.00	
	6.00 MO	0	0	0	0	450	450	75.00
USR AA Dumpster		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Copy Machine		0.00	0.00	0.00	0.00	400.00	400.00	
	6.00 MO	0	0	0	0	2,400	2,400	400.00
USR AA Office Supplies		0.00	0.00	0.00	0.00	200.00	200.00	
	6.00 MO	0	0	0	0	1,200	1,200	200.00
USR AA Port-a-Johns		0.00	0.00	0.00	0.00	85.00	85.00	
	12.00 MO	0	0	0	0	1,020	1,020	85.00
USR AA Office Furniture Rental		0.00	0.00	400.00	0.00	0.00	400.00	
	6.00 MO	0	0	2,400	0	0	2,400	400.00
USR AA Sewer		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Contractors Office Trailer		0.00	600.00	0.00	0.00	0.00	600.00	
	6.00 MO	0	3,600	0	0	0	3,600	600.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA Storage Trailer		0.00	100.00	0.00	0.00	0.00	100.00	
	6.00 MO	0	600	0	0	0	600	100.00
USR AA Postage and Courier Service		0.00	0.00	0.00	0.00	50.00	50.00	
	6.00 MO	0	0	0	0	300	300	50.00
USR AA Computers		0.00	3000.00	0.00	0.00	0.00	3000.00	
	1.00 EA	0	3,000	0	0	0	3,000	3000.00
USR AA Printers		0.00	2000.00	0.00	0.00	0.00	2000.00	
	1.00 EA	0	2,000	0	0	0	2,000	2000.00
USR AA Phones		0.00	100.00	0.00	0.00	0.00	100.00	
	1.00 EA	0	100	0	0	0	100	100.00
USR AA Mobe Office Trailers		0.00	0.00	0.00	600.00	0.00	600.00	
	1.00 EA	0	0	0	600	0	600	600.00
USR AA Small Tool Allowance		0.00	0.00	2000.00	0.00	0.00	2000.00	
	1.00 LS	0	0	2,000	0	0	2,000	2000.00
USR AA Cleaning Service		0.00	0.00	0.00	200.00	0.00	200.00	
	6.00 MO	0	0	0	1,200	0	1,200	200.00
USR AA Temp Electrical Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Water Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
USR AA Temp Sanitary Hookup		0.00	0.00	0.00	500.00	0.00	500.00	
	1.00 EA	0	0	0	500	0	500	500.00
TOTAL TEMP CONSTRUCTION FACILITIES	1.00 JOB	0	9,300	4,700	4,500	6,570	25,070	25070.00
2022.60.02.10. PROJECT UTILITIES								
USR AA Phone Bill		0.00	0.00	0.00	0.00	300.00	300.00	
	6.00 MO	0	0	0	0	1,800	1,800	300.00
USR AA Electric Bill		0.00	0.00	0.00	0.00	450.00	450.00	
	6.00 MO	0	0	0	0	2,700	2,700	450.00
USR AA Water		0.00	0.00	0.00	100.00	0.10	100.10	
	6.00 MO	0	0	0	600	1	601	100.10
TOTAL PROJECT UTILITIES	1.00 JOB	0	0	0	600	4,501	5,101	5100.60

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL GENERAL CONDITIONS	1.00	JOB	208,485	29,766	17,338	8,600	39,891	304,080	304079.67
2022.60.05. DEMO GWTP									
L UPB AA CRANE,HYD,S/P,RT,4WD,40T/84'B			56.51	116.82	0.00	0.00	0.00	173.32	
OOM	160.00	HR	9,041	18,691	0	0	0	27,732	173.32
CIV AA Demo Welded Steel Pipe, 4" Di			7.63	1.07	0.00	0.00	0.00	8.70	
a	2000.00	LF	15,259	2,132	0	0	0	17,391	8.70
CIV AA Demo Welded St Pipe 6" to 12"			14.17	1.98	0.00	0.00	0.00	16.15	
Dia	400.00	LF	5,668	792	0	0	0	6,459	16.15
L AIR AA Structure Demo			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
L AIR AA Equipment Demo/Removal			10396.32	6322.58	0.00	0.00	0.00	16718.90	
	1.00	LS	10,396	6,323	0	0	0	16,719	16718.90
TOTAL DEMO GWTP	1.00	JOB	50,760	34,260	0	0	0	85,020	85019.86
2022.60.10. DEMO PIPING									
L CIV AA Demo Welded Steel Pipe, 4" Di			2.48	0.35	0.00	0.00	0.00	2.83	
a	31320	LF	77,661	10,849	0	0	0	88,510	2.83
L CIV AA Demo Welded St Pipe 6" to 12"			6.20	0.87	0.00	0.00	0.00	7.06	
Dia	4000.00	LF	24,796	3,464	0	0	0	28,260	7.06
TOTAL DEMO PIPING	1.00	JOB	102,457	14,313	0	0	0	116,770	116769.92
2022.60.15. PLUG & ABANDON WELLS									
USR AA Plug and Abandon Injection &			0.00	0.00	0.00	6.00	0.00	6.00	
Extraction Wells	36851	LFT	0	0	0	221,106	0	221,106	6.00
USR AA Plug & Abandon VEA & DPT at			0.00	0.00	0.00	100.00	0.00	100.00	
Surface	400.00	EA	0	0	0	40,000	0	40,000	100.00
TOTAL PLUG & ABANDON WELLS	1.00	JOB	0	0	0	261,106	0	261,106	261106.00

2022.60. DEMO/REMOVAL TREATMENT SYSTEM	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2022.60.20. DISPOSALS									
USR AA Transportation & Disposal at			0.00	0.00	0.00	200.00	0.00	200.00	
RCRA Landfill (Non-Hazardous)	2000.00	TON	0	0	0	400,000	0	400,000	200.00
USR AA Transportation & Disposal -			0.00	0.00	0.00	1000.00	0.00	1000.00	
Hazardous	200.00	TON	0	0	0	200,000	0	200,000	1000.00
TOTAL DISPOSALS	1.00	JOB	0	0	0	600,000	0	600,000	600000.00
TOTAL DEMO/REMOVAL TREATMENT SYSTEM	12.00	MO	361,701	78,339	17,338	869,706	39,891	1,366,975	113914.62
TOTAL O&M MON WELLS & DEMO TREAT SY	1.00	JOB	403,897	78,339	20,251	910,616	49,115	1,462,218	1462217.82

2023. 5. GENERAL CONDITIONS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
2023. TYP. O&M MONITORING WELLS									
2023. 5. GENERAL CONDITIONS									
2023. 5.05. OFFSITE ADMINISTRATIVE COSTS									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Program Mgr.	8.00	HR	827	0	0	0	0	827	103.40
USR AA Senior Engineer/Scientist II;			72.60	0.00	0.00	0.00	0.00	72.60	
O&M Project Manager	40.00	HR	2,904	0	0	0	0	2,904	72.60
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
Purchaser	4.00	HR	290	0	0	0	0	290	72.60
USR AA Engineer/Scientist IV;			59.40	0.00	0.00	0.00	0.00	59.40	
Regulatory Specialist	4.00	HR	238	0	0	0	0	238	59.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	4.00	HR	154	0	0	0	0	154	38.50
USR AA Contractors Chem Quality Cont			84.70	0.00	0.00	0.00	0.00	84.70	
rol	4.00	HR	339	0	0	0	0	339	84.70
Officer									
USR AA Senior Engineer/Scientist IV;			84.70	0.00	0.00	0.00	0.00	84.70	
Project Chemist	4.00	HR	339	0	0	0	0	339	84.70
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III	4.00	HR	414	0	0	0	0	414	103.40
Health and Safety Manager									
(CIH)									
Assume one visit to site.									
USR AA Principal Engineer/Scientist			103.40	0.00	0.00	0.00	0.00	103.40	
III; Contractors CQC System M	2.00	HR	207	0	0	0	0	207	103.40
ana									
USR AA Mileage on Personal Car			0.00	0.00	0.00	0.00	0.31	0.31	
	400.00	MI	0	0	0	0	124	124	0.31
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	2.00	DAY	0	0	0	0	84	84	42.00
USR AA Tolls			0.00	0.00	0.00	0.00	10.00	10.00	
	2.00	EA	0	0	0	0	20	20	10.00
USR AA Rental Car			0.00	0.00	0.00	0.00	45.00	45.00	
	2.00	DAY	0	0	0	0	90	90	45.00

2023. 5. GENERAL CONDITIONS	QUANTY UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL OFFSITE ADMINISTRATIVE COSTS	12.00 MO	5,711	0	0	0	318	6,029	502.43
TOTAL GENERAL CONDITIONS	12.00 MO	5,711	0	0	0	318	6,029	502.43
2023.49. SAMPLING & ANALYSIS								
2023.49.10. COMPLIANCE MONITORING								
2023.49.10.10. PERIMETER MONITORING WELLS								
M AIR AA Polynuclear Aromatic Hydrocarbons, PAH(SW3510/SW8310)	138.00 EA	0.00 0	0.00 0	0.00 0	140.00 19,320	0.00 0	140.00 19,320	140.00
M AIR AA PCP/Semivolatile Organics (8270)	138.00 EA	0.00 0	0.00 0	0.00 0	155.00 21,390	0.00 0	155.00 21,390	155.00
AIR AA Packing Tape Per Roll	10.00 EA	0.00 0	0.00 0	4.00 40	0.00 0	0.00 0	4.00 40	4.00
HTW AA Overnight Shipment samples/8 per chest shipments	18.00 EA	0.00 0	0.00 0	99.00 1,782	0.00 0	0.00 0	99.00 1,782	99.00
HTW AA Blue Ice Soft Packs Equivalent To 4 Lbs Of Ice	18.00 EA	0.00 0	0.00 0	5.02 90	0.00 0	0.00 0	5.02 90	5.02
TOTAL PERIMETER MONITORING WELLS	12.00 MO	0	0	1,912	40,710	0	42,622	3551.86
2023.49.10.25. SAMPLING TECHNICIANS								
2023.49.10.25. 5. SAMPLING GW WELLS 25 wells at 2/day = 13 days per sampling event for the sampling crew and with prep and demobe say 20 days per year.								
USR AA Engineer/Scientist IV	160.00 HR	59.40 9,504	0.00 0	0.00 0	0.00 0	0.00 0	59.40 9,504	59.40
USR AA Technician/Analyst IV	160.00 HR	33.00 5,280	0.00 0	0.00 0	0.00 0	0.00 0	33.00 5,280	33.00
USR AA Mileage on Personal Car	600.00 MI	0.00 0	0.00 0	0.00 0	0.00 0	0.31 186	0.31 186	0.31
USR AA Lodging Mgr and HSO.	28.00 DAY	0.00 0	0.00 0	0.00 0	0.00 0	198.00 5,544	198.00 5,544	198.00

2023.49. SAMPLING & ANALYSIS	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
USR AA M&IE			0.00	0.00	0.00	0.00	42.00	42.00	
	28.00	DAY	0	0	0	0	1,176	1,176	42.00
USR AA Misc Sampling			0.00	0.00	1000.00	0.00	0.00	1000.00	
Equipment/Materials	1.00	LS	0	0	1,000	0	0	1,000	1000.00
TOTAL SAMPLING GW WELLS	4.00	QTR	14,784	0	1,000	0	6,906	22,690	5672.50
2023.49.10.25.10. GW MONITORING REPORT									
USR AA Senior Engineer/Scientist I			67.10	0.00	0.00	0.00	0.00	67.10	
	160.00	HR	10,736	0	0	0	0	10,736	67.10
USR AA Senior Engineer/Scientist II			72.60	0.00	0.00	0.00	0.00	72.60	
	80.00	HR	5,808	0	0	0	0	5,808	72.60
USR AA Technician/Analyst VI			48.40	0.00	0.00	0.00	0.00	48.40	
	32.00	HR	1,549	0	0	0	0	1,549	48.40
USR AA Secretary/Clerical IV			38.50	0.00	0.00	0.00	0.00	38.50	
	32.00	HR	1,232	0	0	0	0	1,232	38.50
USR AA Work Plan Copy			0.00	0.00	0.00	0.00	50.00	50.00	
	40.00	EA	0	0	0	0	2,000	2,000	50.00
USR AA Mail			0.00	0.00	0.00	50.00	0.00	50.00	
	4.00	EA	0	0	0	200	0	200	50.00
TOTAL GW MONITORING REPORT	4.00	QTR	19,325	0	0	200	2,000	21,525	5381.20
TOTAL SAMPLING TECHNICIANS	12.00	MD	34,109	0	1,000	200	8,906	44,215	3684.57
TOTAL COMPLIANCE MONITORING	12.00	MD	34,109	0	2,912	40,910	8,906	86,837	7236.43
TOTAL SAMPLING & ANALYSIS	12.00	MD	34,109	0	2,912	40,910	8,906	86,837	7236.43
2023.55. QC & ANALYTICAL DATA VALIDATION									
2023.55. 5. DATA VALIDATION									
2023.55. 5.10. MONITORING WELL SAMPLES									
USR AA Engineer/Scientist IV			59.40	0.00	0.00	0.00	0.00	59.40	
	40.00	HR	2,376	0	0	0	0	2,376	59.40
TOTAL MONITORING WELL SAMPLES	1.00	YR	2,376	0	0	0	0	2,376	2376.00

2023.55. QC & ANALYTICAL DATA VALIDATI	QUANTY	UOM	LABOR	EQUIPMNT	MATERIAL	SUBCONTR	OTHER	TOTAL COST	UNIT COST
TOTAL DATA VALIDATION	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL QC & ANALYTICAL DATA VALIDATI	12.00	MO	2,376	0	0	0	0	2,376	198.00
TOTAL TYP. O&M MONITORING WELLS	1.00	JOB	42,196	0	2,912	40,910	9,224	95,242	95242.36
TOTAL McCORMICK&BAXTER SUPERFUND SI	1.00	EA	24185701	1,390,299	8,344,647	19352703	20547607	73,820,957	73820957.36

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	AASBC	2 B-asbtswkr + Small Tools			PROD = 100%				CREW HOURS =	1515
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
MIL	B-ASBTSWKRF	Asbestos Workers	0.50	HR	62.89	0.50	31.44			31.44
MIL	XMIXX020 E	Small Tools	0.68	HR	1.57			0.68	1.07	1.07
	TOTAL					2.50	156.22	0.68	1.07	157.29
	AASBG	3 B-asbtswkr + 1 Flatbed Truck			PROD = 100%				CREW HOURS =	2
MIL	XMIXX010 E	Misc. Power Tools	0.50	HR	6.40			0.50	3.20	3.20
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	B-ASBTSWKRF	Asbestos Workers	1.00	HR	62.89	1.00	62.89			62.89
MIL	B-ASBTSWKRL	Asbestos Workers	2.00	HR	62.39	2.00	124.78			124.78
	TOTAL					3.00	187.66	3.50	19.73	207.39
	ACARA	1 B-carpnter + Small Tools			PROD = 100%				CREW HOURS =	60
MIL	B-CARPNTERL	Carpenters	1.00	HR	44.71	1.00	44.71			44.71
MIL	B-CARPNTERF	Carpenters	0.25	HR	45.21	0.25	11.30			11.30
MIL	XMIXX020 E	Small Tools	0.31	HR	1.57			0.31	0.49	0.49
	TOTAL					1.25	56.01	0.31	0.49	56.50
	CLACC	3 B-laborer + 1 Hand Compaction Rammer			PROD = 100%				CREW HOURS =	29
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	C10WC003 E	COMPACTOR, RAMMER, 13"X11" SHOE	1.00	HR	2.33			1.00	2.33	2.33
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					3.00	115.67	1.23	2.69	118.36
	CODEA	1 B-eqoprcrn + 1 1 Cy Hydr. Excavator			PROD = 100%				CREW HOURS =	17
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	H25CA004 E	HYD EXCAV,CRWLR, 1.00CY BKT,LON	1.00	HR	42.66			1.00	42.66	42.66
MIL	XMIXX020 E	Small Tools	0.11	HR	1.57			0.11	0.17	0.17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
	TOTAL					2.00	97.06	1.11	42.83	139.89
	CODEJ	2 B-laborer + 1 Loader/Backhoe			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.25	HR	38.89	0.25	9.72			9.72
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.13	HR	1.57			0.13	0.20	0.20
	TOTAL					3.25	143.01	1.13	18.19	161.20

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	CODEP	4 B-plumber + 1 1.5 Cy Hydr. Excavator, Cwlr			PROD = 100%				CREW HOURS =	57
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	2.00	HR	50.69	2.00	101.38			101.38
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER F	Plumbers	1.00	HR	51.19	1.00	51.19			51.19
MIL	H25CA016 E	HYD EXCAV, CRWLR, 1.50 CY BKT	1.00	HR	61.83			1.00	61.83	61.83
MIL	XMIXX020 E	Small Tools	1.02	HR	1.57			1.02	1.60	1.60
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					6.00	292.07	3.02	69.91	361.98
	CODLB	1 B-eqoprmed + 1 1.5 Cy Front End Ldr, Cwlr			PROD = 100%				CREW HOURS =	17
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50	HR	38.39	0.50	19.19			19.19
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
	TOTAL					1.50	76.20	1.00	32.06	108.26
	CODTK	1 B-eqoprmed + 1 Dozer/Roller, Cat D-8L, 335 Hp			PROD = 100%				CREW HOURS =	114
MIL	B-EQOPRCRNF	Equip. Operators, Crane/Shovel	0.25	HR	59.17	0.25	14.79			14.79
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00	HR	58.67	1.00	58.67			58.67
MIL	R40SO001 E	ROLLR,VIB,SD,TOW,SMPF,25.5T,72"	1.00	HR	25.53			1.00	25.53	25.53
MIL	T10CA017 E	BLADE, UNIVERSAL, HYDR (FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
	TOTAL					1.25	73.46	3.00	121.45	194.91
	COETF	2 B-laborer + 1 8 Cy Dump Truck,Bckhoe/Loadr			PROD = 100%				CREW HOURS =	13
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	L50CA003 E	LDR,BH,WH, 1.38CY FE BKT, 30"DI	1.00	HR	17.99			1.00	17.99	17.99
MIL	XMIXX020 E	Small Tools	0.37	HR	1.57			0.37	0.58	0.58
MIL	T40XX008 E	REAR DUMP BODY, 8 CY,(30,000 GV	1.00	HR	2.75			1.00	2.75	2.75
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
	TOTAL					4.00	177.65	3.37	54.97	232.62
	COETL	3 B-laborer + 2 12 Cy Dump Trck/CrawlrLoadr			PROD = 100%				CREW HOURS =	80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00	HR	56.51	1.00	56.51			56.51
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	2.00	HR	43.87	2.00	87.73			87.73
MIL	L35CA007 E	LDR,FE, CRWLR, 3.75 CY	1.00	HR	84.68			1.00	84.68	84.68
MIL	XMIXX020 E	Small Tools	0.28	HR	1.57			0.28	0.44	0.44
MIL	T40XX010 E	REAR DUMP BODY,12 CY,(36,000 GV	2.00	HR	2.82			2.00	5.63	5.63
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	2.00	HR	33.66			2.00	67.31	67.31
	TOTAL					6.00	259.91	5.28	158.06	417.97

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	COFGA	1 B-eqoprmed + 1 Grader 12-G			PROD = 100%				CREW HOURS =	11
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00	HR	57.01	1.00	57.01			57.01
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
	TOTAL					2.00	95.40	1.00	33.04	128.44
	COKBD	2 B-laborer + 1 Bitum.Dist.Truck/Sweepr			PROD = 100%				CREW HOURS =	1
MIL	A25RS007 E	ASPH DISTR, 3000 GAL, (ADD TR	1.00	HR	15.33			1.00	15.33	15.33
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-TRKDVRLTL	Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
MIL	B15MB004 E	STR SWEEPER, 7'W/SPRINKER, TOWE	1.00	HR	4.05			1.00	4.05	4.05
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
	TOTAL					4.00	163.13	4.00	67.28	230.41
	COMCE	Dozer D6 + Dozer D8 + Ripper + Truck			PROD = 100%				CREW HOURS =	30
MIL	B20VE001 E	BRUSH CHIPPER, 6" DIA. LOG, TRL	2.00	HR	15.44			2.00	30.89	30.89
MIL	L10BS002 E	MULTIAPPLIC RAKE FOR D8L TRACTO	2.00	HR	4.98			2.00	9.96	9.96
MIL	R10CA011 E	RIPPER,SING-SHNK BEAM, HYD, D-8	1.00	HR	8.33			1.00	8.33	8.33
MIL	R10CA013 E	RIPPER, SHANKS EA, D-8	1.00	HR	0.72			1.00	0.72	0.72
MIL	T10CA010 E	BLADE, ANGLE, HYDR, FOR D6	1.00	HR	4.32			1.00	4.32	4.32
MIL	T10CA011 E	WINCH,(W/O CABLE),FOR D6 TRACTO	1.00	HR	5.55			1.00	5.55	5.55
MIL	T10CA017 E	BLADE, UNIVERSAL,HYDR,FOR D8	1.00	HR	7.95			1.00	7.95	7.95
MIL	T15CA008 E	DOZER,CWLR,D-6D,PS,(ADD BLADE)	1.00	HR	35.45			1.00	35.45	35.45
MIL	T15CA015 E	DOZER,CWLR,CAT D-8L, (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T50FO004 E	TRK,HWY,4X4,F250,3/4T,8800 GVW	1.00	HR	8.70			1.00	8.70	8.70
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	B-EQOPRLT L	Eq Oper, Light	2.00	HR	54.50	2.00	108.99			108.99
MIL	B-EQOPRMEDL	Eq Oper, Medium	2.00	HR	56.51	2.00	113.01			113.01
MIL	B-LABORER L	Laborer (Semi-Skilled)	4.00	HR	38.39	4.00	153.56			153.56
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	38.89	1.00	38.89			38.89
	TOTAL					9.00	414.45	14.00	202.98	617.43
	EELEB	2 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	844
MIL	B-ELECTRN F	Electricians	0.50	HR	36.43	0.50	18.21			18.21
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.23	HR	1.57			0.23	0.36	0.36
	TOTAL					2.50	90.07	0.23	0.36	90.43
	EELEF	4 B-electrn + Small Tools			PROD = 100%				CREW HOURS =	203
MIL	B-ELECTRN F	Electricians	0.66	HR	36.43	0.66	24.04			24.04
MIL	B-ELECTRN A	Electricians	2.00	HR	29.72	2.00	59.44			59.44
MIL	B-ELECTRN L	Electricians	2.00	HR	35.93	2.00	71.86			71.86
MIL	XMIXX020 E	Small Tools	0.45	HR	1.57			0.45	0.71	0.71
	TOTAL					4.66	155.34	0.45	0.71	156.04

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MPLUA	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	951
MIL	B-PLUMBER F	Plumbers	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	XMIXX020 E	Small Tools	0.34	HR	1.57			0.34	0.53	0.53
	TOTAL					1.25	63.49	0.34	0.53	64.02
	MPLUC	1 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	37
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.10	HR	51.19	0.10	5.12			5.12
MIL	XMIXX020 E	Small Tools	0.19	HR	1.57			0.19	0.30	0.30
	TOTAL					1.10	55.81	0.19	0.30	56.11
	MPLUE	1 B-plumber/laborer + Small Tools			PROD = 100%				CREW HOURS =	1232
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.67	HR	1.57			0.67	1.05	1.05
	TOTAL					2.50	114.67	0.67	1.05	115.72
	MPLUJ	2 B-plumber + Small Tools			PROD = 100%				CREW HOURS =	664
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
	TOTAL					3.50	157.12	1.01	1.59	158.70
	MPLUK	2 B-plumber + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	418
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-PLUMBER A	Plumbers	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-PLUMBER L	Plumbers	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-PLUMBER F	Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	1.01	HR	1.57			1.01	1.59	1.59
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					3.50	157.12	2.01	3.23	160.35
	MSPFA	1 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	1733
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	XMIXX020 E	Small Tools	0.36	HR	1.57			0.36	0.57	0.57
	TOTAL					1.25	63.49	0.36	0.57	64.05

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	MSPFB	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	2722
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFD	2 B-stm/pipe + Small Tools			PROD = 100%				CREW HOURS =	75
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
	TOTAL					2.50	118.73	0.72	1.13	119.86
	MSPFE	2 B-stm/pipe + 1 300 Amp Welding Machine			PROD = 100%				CREW HOURS =	7647
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEF	Steam / Pipefitters	0.50	HR	51.19	0.50	25.59			25.59
MIL	XMIXX020 E	Small Tools	0.72	HR	1.57			0.72	1.13	1.13
MIL	W35XX009 E	WELDER, 300 AMP, SKID,ELEC DRIV	1.00	HR	1.65			1.00	1.65	1.65
	TOTAL					2.50	118.73	1.72	2.78	121.50
	MSPFH	2 B-stm/pipe + 1 200 Amp Welding Machine			PROD = 100%				CREW HOURS =	338
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00	HR	38.39	1.00	38.39			38.39
MIL	B-STM/PIPEF	Steam / Pipefitters	0.25	HR	51.19	0.25	12.80			12.80
MIL	B-STM/PIPEL	Steam / Pipefitters	1.00	HR	50.69	1.00	50.69			50.69
MIL	B-STM/PIPEA	Steam / Pipefitters	1.00	HR	42.44	1.00	42.44			42.44
MIL	XMIXX020 E	Small Tools	0.82	HR	1.57			0.82	1.29	1.29
MIL	W35XX002 E	WELDER, 200 AMP, W/1 AXLE TRLR	1.00	HR	6.48			1.00	6.48	6.48
	TOTAL					3.25	144.32	1.82	7.77	152.09
	ULABB	2 B-laborer + Small Tools			PROD = 100%				CREW HOURS =	131
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00	HR	38.39	2.00	76.78			76.78
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50	HR	38.89	0.50	19.44			19.44
MIL	XMIXX020 E	Small Tools	0.27	HR	1.57			0.27	0.42	0.42
	TOTAL					2.50	96.22	0.27	0.42	96.65
	XASPA	7 X-laborer + 1 Asphalt Paving Machine			PROD = 100%				CREW HOURS =	52
MIL	A30BG003 E	ASPH FINISHER, 10'W/SCREED,PNEU	1.00	HR	57.79			1.00	57.79	57.79
MIL	B15MB002 E	STR SWEEPER, 7'W/SPRINKER	1.00	HR	1.64			1.00	1.64	1.64
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	R30IG008 E	ROLLER,STATIC,3WHL,S/P, 12T,84"	2.00	HR	16.60			2.00	33.20	33.20
MIL	T40XX016 E	FLATBED, 8'x 16.0' (ADD TRK	1.00	HR	0.71			1.00	0.71	0.71
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25
MIL	T50FO011 E	TRK,HWY, 24,500 GVW, 4X2, 2 AXL	1.00	HR	14.25			1.00	14.25	14.25

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	7.00	HR	38.39	7.00	268.73			268.73
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	3.00	HR	56.51	3.00	169.52			169.52
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRHVL	Outside Truck Drivers, Heavy	1.00	HR	43.87	1.00	43.87			43.87
	TOTAL					12.00	539.12	10.00	140.56	679.68
	XLABB	2 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	74
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					2.34	90.00	1.00	1.57	91.57
	XLABC	3 X-laborer + Small Tools			PROD = 100%				CREW HOURS =	6
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-LABORER F	Outside Laborers, (Semi-Skilled	0.34	HR	38.89	0.34	13.22			13.22
	TOTAL					3.34	128.39	1.00	1.57	129.96
	XPLUC	1 X-plumber + Small Tools			PROD = 100%				CREW HOURS =	12
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-PLUMBER F	Outside Plumbers	0.17	HR	51.19	0.17	8.70			8.70
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					3.17	136.17	1.00	1.57	137.74
	XSABA	3 X-eqoprmed + 1 Grader, 2 Rollers, 3 Trucks			PROD = 100%				CREW HOURS =	3
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	2.00	HR	42.48	2.00	84.96			84.96
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	T60KI002 E	TRK,WTR,OF-HY, 6000GAL,W/CAT621	1.00	HR	61.65			1.00	61.65	61.65
MIL	A10ET001 E	CHIPSPREADER,S/P, 10'W, MECH	1.00	HR	18.31			1.00	18.31	18.31
MIL	L35CA004 E	LDR,FE, CRWLR, 1.50 CY	1.00	HR	32.06			1.00	32.06	32.06
MIL	T15CA015 E	DOZER,CWLR, D-8L,PS (ADD BLADE	1.00	HR	87.97			1.00	87.97	87.97
MIL	T10CA016 E	BLADE, STRAIGHT, HYDR (FOR D8	1.00	HR	7.45			1.00	7.45	7.45
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
	TOTAL					8.00	370.15	6.00	240.47	610.62
	XSGRA	3 X-eqoprmed + 1 Shpf Roller,Grader,Water Truck			PROD = 100%				CREW HOURS =	25
MIL	G15CA003 E	GRADER,MOTOR, ARTIC, CAT 12-G	1.00	HR	33.04			1.00	33.04	33.04
MIL	XMIXX020 E	Small Tools	2.00	HR	1.57			2.00	3.14	3.14
MIL	R30CA001 E	ROLLR,STATIC,S/P,13T,84"W,11TIR	1.00	HR	15.58			1.00	15.58	15.58
MIL	T40XX033 E	WATER TANK, 3000 GAL (ADD TRK	1.00	HR	3.40			1.00	3.40	3.40
MIL	T50KE003 E	TRK,HWY, 46,000 GVW, 6X4, 3 AXL	1.00	HR	33.66			1.00	33.66	33.66
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	2.00	HR	38.39	2.00	76.78			76.78
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	2.00	HR	56.51	2.00	113.01			113.01

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
MIL	X-EQOPRMEDF	Outside Equip. Operators, Mediu	1.00	HR	57.01	1.00	57.01			57.01
MIL	X-TRKDVRLTL	Outside Truck Drivers, Light	1.00	HR	42.48	1.00	42.48			42.48
	TOTAL					6.00	289.28	6.00	88.82	378.09
	XXPLA	3 X-laborer + 1 20 Ton Crane, Hydraulic R/T			PROD = 1008				CREW HOURS = 498	
MIL	C75GV002 E	CRANE,HYD,S/P,RT,4WD,20T/70'BOO	1.00	HR	33.07			1.00	33.07	33.07
MIL	XMIXX020 E	Small Tools	1.00	HR	1.57			1.00	1.57	1.57
MIL	X-LABORER L	Outside Laborers, (Semi-Skilled	3.00	HR	38.39	3.00	115.17			115.17
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
MIL	X-PLUMBER F	Outside Plumbers	0.50	HR	51.19	0.50	25.59			25.59
MIL	X-PLUMBER L	Outside Plumbers	1.00	HR	50.69	1.00	50.69			50.69
	TOTAL					5.50	247.96	2.00	34.64	282.60
	XXQOK	1 X-eqoprhvy + 1 25 Ton Shear/Hydr. Excavator			PROD = 1008				CREW HOURS = 160	
MIL	H25CA007 E	HYD EXCAV, CRWLR, 2.00 CY BKT	1.00	HR	88.70			1.00	88.70	88.70
MIL	H25LU009 E	SHEAR,32"OPEN,32"THROAT, 9'0"RC	1.00	HR	28.11			1.00	28.11	28.11
MIL	X-EQOPRMEDL	Outside Equip. Operators, Mediu	1.00	HR	56.51	1.00	56.51			56.51
	TOTAL					1.00	56.51	2.00	116.82	173.32

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	A-1E/S III	Engineer/Scientist III	23.00	0.00	61.00	0.00	0.00	37.03	HR	06/05/01	0.00	7476
USR	A-1E/S IV	Engineer/Scientist IV	27.00	0.00	61.00	0.00	0.00	43.47	HR	06/05/01	0.00	142066
USR	A-1PE/SI	Prin. Engineer/Scientist I	41.50	0.00	61.00	0.00	0.00	66.82	HR	06/05/01	0.00	4600
USR	A-1S/C II	Secretary/Clerical II	12.00	0.00	61.00	0.00	0.00	19.32	HR	06/05/01	0.00	7476
USR	A-1SE/SII	Senior Engineer/Scientist II	33.00	0.00	61.00	0.00	0.00	53.13	HR	06/05/01	0.00	138742
USR	A-1SE/SIV	Senior Engineer/SCientist IV	38.50	0.00	61.00	0.00	0.00	61.99	HR	06/05/01	0.00	31216
USR	A-1T- VI	Technician VI	22.00	0.00	61.00	0.00	0.00	35.42	HR	06/05/01	0.00	40
USR	A2-E/SII	Engineer/Scientist II	19.00	0.00	120.00	0.00	0.00	41.80	HR	06/05/01	0.00	4300
USR	A2-E/SIII	Engineer/Scientist III	23.00	0.00	120.00	0.00	0.00	50.60	HR	06/05/01	0.00	160
USR	A2-E/SIV	Engineer/Scientist IV	27.00	0.00	120.00	0.00	0.00	59.40	HR	06/05/01	0.00	15948
USR	A2-PE/SI	Prin. Engineer/Scientist I	41.50	0.00	120.00	0.00	0.00	91.30	HR	06/05/01	0.00	4948
USR	A2-PE/SIII	Prin. Engineer/Scientist III	47.00	0.00	120.00	0.00	0.00	103.40	HR	06/05/01	0.00	4843
USR	A2-S/CIV	Secretary/Clerical IV	17.50	0.00	120.00	0.00	0.00	38.50	HR	06/05/01	0.00	5902
USR	A2-SE/SI	Senior Engineer/Scientist I	30.50	0.00	120.00	0.00	0.00	67.10	HR	06/05/01	0.00	5264
USR	A2-SE/SII	Senior Engineer/Scientist II	33.00	0.00	120.00	0.00	0.00	72.60	HR	06/05/01	0.00	17180
USR	A2-SE/SIII	Senior Engineer/Scientist III	36.00	0.00	120.00	0.00	0.00	79.20	HR	06/05/01	0.00	280
USR	A2-SE/SIV	Senior Engineer/Scientist IV	38.50	0.00	120.00	0.00	0.00	84.70	HR	06/05/01	0.00	4744
USR	A2-T/AIV	Technician IV	15.00	0.00	120.00	0.00	0.00	33.00	HR	06/05/01	0.00	3952
USR	A2-T/AVI	Technician VI	22.00	0.00	120.00	0.00	0.00	48.40	HR	06/05/01	0.00	2776
MIL	B-ASBTSWKR	Asbestos Workers	38.50	0.00	41.40	7.93	0.00	62.39	HR	06/05/01	25.09	3795
MIL	B-CARPNTER	Carpenters	23.45	0.00	41.40	11.54	0.00	44.71	HR	06/05/01	22.87	75
MIL	B-ELECTRN	Electricians	21.95	0.00	41.50	4.88	0.00	35.93	HR	06/05/01	27.92	3216
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	32.23	0.00	41.40	13.08	0.00	58.67	HR	06/05/01	23.41	217
MIL	B-EQOPRLT	Equip. Operators, Light	29.28	0.00	41.50	13.08	0.00	54.50	HR	06/05/01	15.97	60
MIL	B-EQOPRMED	Equip. Operators, Medium	30.70	0.00	41.50	13.08	0.00	56.51	HR	06/05/01	15.97	511
MIL	B-LABORER	Laborers, (Semi-Skilled)	21.64	0.00	41.50	7.78	0.00	38.39	HR	06/05/01	12.50	4562
MIL	B-PLUMBER	Plumbers	29.14	0.00	41.40	9.47	0.00	50.69	HR	06/05/01	22.98	6009
MIL	B-STM/PIPE	Steam / Pipefitters	29.14	0.00	41.40	9.47	0.00	50.69	HR	06/05/01	27.95	29036
MIL	B-TRKDVRHV	Truck Drivers, Heavy	22.67	0.00	41.40	11.80	0.00	43.87	HR	06/05/01	11.56	174
MIL	B-TRKDVRLT	Truck Drivers, Light	21.69	0.00	41.40	11.80	0.00	42.48	HR	06/05/01	9.51	1
MIL	X-EQOPRMED	Outside Equip. Operators, Medium	30.70	0.00	41.50	13.08	0.00	56.51	HR	06/05/01	21.21	1029
MIL	X-LABORER	Outside Laborers, (Semi-Skilled)	21.64	0.00	41.50	7.78	0.00	38.39	HR	06/05/01	9.72	2566
MIL	X-PLUMBER	Outside Plumbers	29.14	0.00	41.40	9.47	0.00	50.69	HR	06/05/01	20.49	7317
MIL	X-TRKDVRHV	Outside Truck Drivers, Heavy	22.67	0.00	41.40	11.80	0.00	43.87	HR	06/05/01	19.23	52
MIL	X-TRKDVRLT	Outside Truck Drivers, Light	21.69	0.00	41.40	11.80	0.00	42.48	HR	06/05/01	17.09	31

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	TOTAL ** HOURS
UPB	A10ET001	CHIPSPREADER,S/P, 10'W, MECH	5.67	1.96	3.75	0.93	0.26	0.04	5.70	18.31 HR	3
UPB	A25RS007	ASPH DISTR, 3000 GAL	3.98	1.10	4.32	1.42			4.51	15.33 HR	1
UPB	A30BG003	ASPH FINISHER, 10'W/SCREED,PNEUM	18.65	6.46	4.91	1.42	1.16	0.18	25.01	57.79 HR	52
UPB	B15MB002	STR SWEEPER, 7'W/SPRINKER	0.64	0.18		0.14			0.69	1.64 HR	52
UPB	B15MB004	STR SWEEPER, 7'W/SPRINKER, TOWED	0.86	0.25	1.56	0.38	0.05	0.01	0.94	4.05 HR	1
MIL	B20VE001	B-CHIPPER, 6" DIA LOG, TRLR-MTD	1.61	0.45	8.56	2.82	0.04	0.01	1.96	15.44 HR	60
MIL	C10WC003	COMPACTOR, RAMMER, 11"X13" SHOE	0.62	0.11	0.48	0.12			1.00	2.33 HR	29
MIL	C75GV002	CRANE,HYD,S/P,RT,4WD,20T/70'BOOM	10.81	4.66	3.88	1.20	1.14	0.18	11.20	33.07 HR	498
MIL	C80PA003	CRANE,HYD,TRK MTD, 4.5T/52'BOOM	1.95	0.81		0.10			1.51	4.37 HR	80
UPB	F10CA024	FORK LIFT,R/T 8,000#,16.00'L-HT	3.62	1.31	2.15	0.53	0.52	0.08	3.72	11.94 HR	320
UPB	G15CA003	GRADER,MOTOR, ARTIC, CAT 12-G	10.86	4.86	3.92	1.37	0.55	0.09	11.39	33.04 HR	39
MIL	H25CA004	HYD EXCAV,CRWLR, 1.00CY BKT,LONG	15.83	4.80	3.63	1.42			16.98	42.66 HR	17
UPB	H25CA007	HYD EXCAV, CRWLR, 2.00 CY BKT	31.61	10.66	7.26	2.84			36.33	88.70 HR	160
UPB	H25CA016	HYD EXCAV, CRWLR, 1.50 CY BKT	22.50	6.83	6.01	2.35			24.14	61.83 HR	57
UPB	H25LU009	SHEAR,32"OPEN,32"THROAT, 9'0"RCH	11.27	2.23		1.70			12.92	28.11 HR	160
MIL	L10BS002	MULTI-APPLICATION RAKE, 12.5W 9T	1.82	0.50		0.30			2.35	4.98 HR	60
UPB	L35CA004	LDR,FE, CRWLR, 1.50 CY	8.68	2.93	2.75	1.07			16.64	32.06 HR	20
UPB	L35CA007	LDR,FE, CRWLR, 3.75 CY	22.94	7.73	7.21	2.82			43.98	84.68 HR	80
MIL	L40CA001	LDR,FE, WH, 1.25 CY, ARTIC, 910E	5.79	2.23	2.06	0.89	0.83	0.13	6.01	17.93 HR	120
UPB	L50CA003	LDR,BH,WH, 1.38CY FE BKT, 30"DIP	5.53	2.11	2.44	0.80	0.48	0.07	6.55	17.99 HR	23
UPB	R10CA011	RIPPER, 1-SHANK BEAM,HYD, D-8	3.21	0.89		0.10			4.14	8.33 HR	30
UPB	R10CA013	RIPPER, SHANKS EACH, D-8	0.28	0.08					0.36	0.72 HR	30
UPB	R30CA001	ROLLR,STATIC,S/P,13T,84"W,11TIRE	5.11	1.54	2.44	0.60	0.98	0.15	4.75	15.58 HR	77
UPB	T10CA010	BLADE, ANGLE, HYDR, D-6	1.71	0.58		0.08			1.96	4.32 HR	30
MIL	T10CA011	WINCH, (ADD CABLE), D-6	2.20	0.74		0.08			2.53	5.55 HR	30
UPB	T10CA016	BLADE, STRAIGHT, HYDR, D-8	2.95	0.99		0.12			3.38	7.45 HR	3
UPB	T10CA017	BLADE, UNIVERSAL, HYDR, D-8	3.15	1.06		0.13			3.61	7.95 HR	144
MIL	T15CA008	DOZER,CWLR, D-6D,PS	9.01	3.34	4.80	1.78			16.52	35.45 HR	30
MIL	T15CA015	DOZER,CWLR, D-8L,PS	26.41	8.90	11.50	3.32			37.85	87.97 HR	147
MIL	T30DW001	TRENCHR,CHN, 24"DP,6"W,WLK-BEHND	0.41	0.12	0.78	0.22	0.04	0.01	0.51	2.08 HR	32
UPB	T40XX008	REAR DUMP BODY, 8.0CY	1.20	0.33		0.09			1.13	2.75 HR	13
UPB	T40XX010	REAR DUMP BODY, 12.0CY	1.23	0.34		0.09			1.16	2.82 HR	160
MIL	T40XX016	FLATBED, 8'x 16.0'	0.34	0.09					0.27	0.71 HR	54
UPB	T40XX033	WATER TANK, 3000 GAL	1.63	0.45					1.32	3.40 HR	25
MIL	T50FO002	TRK,HWY, 6,250GVW,4X4, 1/2T-PKUP	1.75	0.49	2.41	0.70	0.22	0.03	1.91	7.52 HR	1280
UPB	T50FO004	TRK,HWY, 8,800GVW,4X4, 3/4T-PKUP	2.03	0.56	2.83	0.82	0.23	0.03	2.21	8.70 HR	30
UPB	T50FO011	TRK,HWY, 24,700 GVW, 4X2, 2 AXLE	2.87	0.97	4.94	1.32	1.03	0.16	2.96	14.25 HR	107
MIL	T50KE003	TRK,HWY, 46,000 GVW, 6X4, 3 AXLE	9.42	2.64	9.46	2.73	0.44	0.07	8.89	33.66 HR	199
UPB	T60KI002	TRK,WTR,OF-HY, 6000GAL,W/CAT621E	18.15	7.76	10.45	3.45	4.07	0.63	17.13	61.65 HR	3
UPB	W35XX002	WELDER, 200 AMP, W/1 AXLE TRLR	0.49	0.17	4.18	1.03	0.03	0.01	0.57	6.48 HR	395
UPB	W35XX009	WELDER, 300 AMP, SKID,ELEC DRIVE	0.37	0.09	0.66	0.27			0.26	1.65 HR	8065
UPB	XMIXX010	MISC. POWER TOOLS	2.17	0.76	0.60	0.27			2.60	6.40 HR	1
UPB	XMIXX020	SMALL TOOLS	0.50	0.22	0.16	0.07			0.63	1.57 HR	12940

McCORMICK & BAXTER SUPERFUND SITE

6/5/01

ASSUMED MARKUPS ON LABOR FOR ESTIMATE

	FICA	FUTA	SUI	WC	BENEFITS	OH	TOTAL
OFFICE STAFF (MANAGERS, ENGINEERS, CLERICAL)	7.65%	0.80%	4.00%	1.00%	36.00%	70.55%	**120.00%**
FIELD STAFF (ENGINEERS, MANAGERS, TECHNICIANS)	7.65%	0.80%	4.00%	2.00%	36.00%	10.55%	**61.00%**
CRAFT LABOR	7.65%	0.80%	4.00%	19.00%	0.00%	10.00%	**41.45%**

NOTES:

1 Workmans Compensation rates for craft labor are an average of laborer, operator, and skilled labor as published by RS Means for Heavy Construction.
Workmans Compensation rates for Office and Field Staff personnel are based on the rates of large construction firms based on experience and estimating practices of URS Construction Group

2 Benefits of 36% for Office and Field Staff are based on experience of large construction firms (over 1.5M revenues/year) used by estimating practices and cost experience of URS Construction Group.
Benefits for craft labor are included in the base rate for each particular craft and are taken from the latest Davis-Bacon General Decision for the Stockton (No. CA000029 dated 10/27/2000) escalated 3%.

3 Overhead rates for craft labor are based on RS Means averages for larger construction companies.
Overhead rates for craft labor would cover administrative costs (e.g. payroll, hiring, human resourses), training, medical surveillance, and other costs directly associated with craft labor.
Overhead rates for Office Staff and Field Staff personnel are based on typical values for large engineering/construction companies as used in estimating practices and cost experience of URS Construction Group.
Overhead rates for Field Staff assumes minimum of 6 months assignment to a field office.
Overhead rates for all labor would include costs for insurance such as Builders Risk (typically average of 0.34% per RS Means) and Public Liability Insurance (1.55%).

4 State Unemployment rates are based on typical rates for large construction companies working in the State of California as reported by Paychex Inc. (local broker) as median of rates ranging from 3.2 to 5.4%.

** CONTRACTOR SETTINGS **

	AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor										
G&A; 6%	6.00									
PROFIT; 10%	10.00									
BOND; 0.5%	0.50									
PL Mechanical Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
PV Paving Subcontractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									
EL Electrical Contractor										
G&A; 6%	15.00									
PROFIT; 10%	10.00									
BOND; 0.5%	1.50									

No errors detected...

* * * END OF ERROR REPORT * * *