Johnson Controls, Fullerton CA

Conceptual Site Model Presentation
Facility History

- Standard Products owned during initial development in 1956.


- Second expansion of facility in 1980.

- Site purchased by Lowe Enterprises and scheduled for redevelopment after hand over of clean site (completely demolished and remediated) from Johnson Controls.
Site Development Over Time

AUGUST 1996

JUNE 1972

SEPTEMBER 2015
Environmental Setting

- **Topography** – flat, gentle regional slope to W and SW

- **Climate**

- **Geology**
  - Coastal Plain Basin filled with alluvium deposited by streams and sheet flow from erosion of surrounding hills/mountains.
  - Underlying soil in upper 20 feet is silt, clayey silt and sandy silt with layers of sand and clay

- **Hydrology**
  - Surface water drainage to north towards sewer line
  - Carbon creek nearest surface drainage (0.5 miles S of site)

- **Hydrogeology**
  - Principal aquifer 115-125 feet bgs
  - GW flow is WNW
  - Orange County Water District observation well FM-5 – installed 1992 screened 121-141 feet bgs
  - Public Water Supply Well F-KIM1A – installed 2002 multiple screens from 500-1225 feet bgs

- **Land Use** – commercial light industrial
Stakeholders

- DTSC – lead agency due to Tier 1 wastewater permit
- Johnson Controls (Entact)
- Lowe Enterprises
- Orange County Water District
Environmental Issues

- Releases to surface soils from plant activities (mostly lead)
- Leaking fuels tanks releasing to soils and GW?
- Solvent releases from site activities and offsite activities
Receptor Conceptual Site Model
Site Investigations - Metals

• 2005
  – 64 borings sampled generally from 0.5 -1 and 2-2.5 feet bgs
  – submitted for Pb (6010)
  – samples collected deeper in production areas

• 2006
  – 31 additional borings sample from 2-2.5 feet bgs,
  – Submitted for Pb and pH (6010)
  – 8 locations submitted for CAM 17 metals based on the lead and pH results
### Lead Screening Criteria

<table>
<thead>
<tr>
<th>Source</th>
<th>Concentration in mg/kg</th>
<th>Exposure Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL EPA</td>
<td>150</td>
<td>Direct Contact residential</td>
</tr>
<tr>
<td>CAL EPA</td>
<td>800</td>
<td>Direct contact industrial</td>
</tr>
<tr>
<td>EPA Region 9 PRGs</td>
<td>750</td>
<td>Direct contact industrial</td>
</tr>
</tbody>
</table>
Distribution of Metals

• Isolated Pb hot spots appear to be correlated to activities at former casting (B12), former pasting (B6), acidifying area (D17)
• No evidence of obvious metals impact observed in soils
• No samples taken from area under acid tanks, former wastewater treatment area, and charging area – areas will be sampled after demolition
# Exceedences of Industrial Standard

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth bgs in feet</th>
<th>Conc. in ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6 (former pasting, mill area)</td>
<td>3.5-4</td>
<td>1400</td>
</tr>
<tr>
<td>D17 (former acidifying, outside pre 1972)</td>
<td>0.5-1</td>
<td>360*</td>
</tr>
<tr>
<td></td>
<td>2-2.5</td>
<td>910</td>
</tr>
<tr>
<td>B12 (former casting, outside pre 1972)</td>
<td>2-2.5</td>
<td>8400</td>
</tr>
</tbody>
</table>

Exceedences all bound with depth

* Above residential criteria only
# Exceedences of Residential Standard

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth bgs in feet</th>
<th>Conc. in ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>0.5 – 1.0</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>2-2.5</td>
<td>520</td>
</tr>
<tr>
<td>H39</td>
<td>2-2.5</td>
<td>210</td>
</tr>
<tr>
<td>G32</td>
<td>2-2.5</td>
<td>150</td>
</tr>
<tr>
<td>F29</td>
<td>0.5-1.0</td>
<td>150</td>
</tr>
</tbody>
</table>
pH results

- pH collected from 20 samples in 2006
  - ranged from 2.4 - 10.7
  - lowest pH at SB79, lead concentration = 3.4 ppm
  - Aside from SB 79 pH ranged from 7.5 – 10.7
  - Does not appear to correlate with metal hot spots in soil
Other metals

- SB79, SB84, SB85, SB92, SB94, SB95, SB98, SB106, B12, D17, and B6 submitted for CAM17 metals
- Results compared to background and Region 9 PRG Direct Contact values
- As only metal above background of 3.5 mg/kg

<table>
<thead>
<tr>
<th>Boring</th>
<th>Depth in feet</th>
<th>Conc in ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6</td>
<td>3.5-4</td>
<td>5.9</td>
</tr>
<tr>
<td>SB85</td>
<td>2-2.5</td>
<td>10.1</td>
</tr>
<tr>
<td></td>
<td>4.5-5</td>
<td>4.1</td>
</tr>
<tr>
<td>SB92</td>
<td>2-2.5</td>
<td>21.2</td>
</tr>
<tr>
<td>SB106</td>
<td>2-2.5</td>
<td>4.0</td>
</tr>
</tbody>
</table>
## Proposed Interim Removals for Metals

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth of Excavation in feet</th>
<th>Metal of concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6</td>
<td>4.5</td>
<td>Pb, As</td>
</tr>
<tr>
<td>B12</td>
<td>3</td>
<td>Pb</td>
</tr>
<tr>
<td>D17</td>
<td>3</td>
<td>Pb</td>
</tr>
<tr>
<td>SB85</td>
<td>5</td>
<td>As</td>
</tr>
<tr>
<td>SB92</td>
<td>3</td>
<td>As</td>
</tr>
</tbody>
</table>

- Proposal missing As exceedence at SB106, not addressing residential exceedences for Pb
- Approx 320 CY likely to be removed
# Organics analysis

<table>
<thead>
<tr>
<th>Location</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB93, 94</td>
<td>SVOCs - Waste Storage in parking lot</td>
</tr>
<tr>
<td>SB91</td>
<td>SVOCs - Maintenance building, former UST</td>
</tr>
<tr>
<td>SB88</td>
<td>SVOCs - Near air compressor</td>
</tr>
<tr>
<td>SB107, 108, 109</td>
<td>SVOCs - Near UST</td>
</tr>
<tr>
<td>SB104, 105</td>
<td>PCBs near transformers</td>
</tr>
</tbody>
</table>

- Results were below detection limits
TPH related issues

• 10,000 gal diesel UST and spills at maintenance building
• 6,000 gal gasoline UST and 1,000 gal diesel UST in southeast corner of property
• Former Waste water treatment area in front of building
Maintenance Building

• 10,000 diesel UST removed from maintenance building in 1993
  – 34 tons of PCS removed, site closed with concurrence of City of Fullerton Fire Department Fire Prevention Bureau

• ASTs and floor spills observed in building, but concrete pad in place
Maintenance Building TPH 2005 sampling

- F29 placed in former UST area – only drilled to 5 feet, no TPH samples
- K54 placed between service bays in building – sample from 2’submitted for TPH. Results ND
- SB91 – submitted for SVOCs only – results ND
Southeast UST area

- USTs reportedly removed in 1983, but no closure records available
- Soil borings J47-56, J58-60, and J68 drilled in UST area
  - J49 and 58 encountered obstruction and fill at 2 feet. Staining seen in J49
  - Diesel odor/staining in J47, 48, 53, and 60 from 10-15 feet bgs
  - Gasoline odor in J60 to 8 feet
Sample Results near Southeast UST area

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth in feet</th>
<th>Conc in ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>J47</td>
<td>14</td>
<td>DRO = 530</td>
</tr>
<tr>
<td>J49</td>
<td>2</td>
<td>DRO = 3500, GRO = 12</td>
</tr>
<tr>
<td>J53</td>
<td>12</td>
<td>DRO = 210</td>
</tr>
<tr>
<td>J60</td>
<td>2</td>
<td>DRO = 2000, GRO = 960, EX</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>DRO = 2000, GRO = 470, EX</td>
</tr>
</tbody>
</table>

- Orange County Healthcare Agency screening criteria = 100 mg/kg for residential and 2,040 mg/kg for commercial/industrial
Waste Water Treatment area

- In ground clarifier abandoned in place north of building in 1980s
- Upper portion of concrete reportedly removed and plumbing disconnected
- I46 and 57 located within former site (I44 and 45 mislocated)
- Obstruction encountered at 4.5 feet at I46
- TPH ND at maximum depth of 9 feet
Proposed TPH removals

- Approx 25 CY likely to be removed
- What if tank is present?
Volatile Organics Issue

- 2005 - 6 samples submitted for VOCs (8260)
- Results all ND

<table>
<thead>
<tr>
<th>C15, 16</th>
<th>Tooling area</th>
</tr>
</thead>
<tbody>
<tr>
<td>F29</td>
<td>Maintenance Area</td>
</tr>
<tr>
<td>I57</td>
<td>Former Waste water Treatment area</td>
</tr>
<tr>
<td>D67, L69</td>
<td>Storage areas</td>
</tr>
</tbody>
</table>
2006 Volatile Organics Sampling

- Additional soil gas sampling requested by DTSC
- Semi permanent soil gas implants placed within soil borings to initial depths of 5’ by either:
  - 10” section of permeable screen connected to ¼”OD polyethylene tubing
  - ¼”OD polyethylene tubing perforated in last 6”
  - Screen interval filled in with sand overlying bentonite
- Soil gas sample location step outs based on initial readings (lateral and with depth)
- Collocated soil samples collected from samples with detected soil gas readings
- Samples analyzed by on-site laboratory
Soil gas Screening criteria

- Screening criteria calculated using Office of Environmental Health Hazard Assessment values with attenuation factor, based on indoor air for commercial industrial use
- PCE and TCE soil gas < screening criteria

<table>
<thead>
<tr>
<th>Compound</th>
<th>Value in ug/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCE</td>
<td>1.732</td>
</tr>
<tr>
<td>TCE</td>
<td>5.1</td>
</tr>
<tr>
<td>DCE</td>
<td>NA</td>
</tr>
<tr>
<td>Cis DCE</td>
<td>127.75</td>
</tr>
<tr>
<td>Toluene</td>
<td>1095</td>
</tr>
<tr>
<td>Xylenes</td>
<td>2550</td>
</tr>
<tr>
<td>TCF</td>
<td>NA</td>
</tr>
</tbody>
</table>
Soil Gas results

• PCE: Detected in 20 samples (1.1 - 100 ug/L) in SE corner
• TCE: Detected in 14 samples (1.1 - 33 ug/L) in SE corner
• DCE: Detected in 15 samples (1.2 - 170 ug/L) in SE corner
• Cis DCE: Detected in 7 samples (1 - 53 ug/L) in SE corner
• Toluene: Detected in 2 samples (1.2 -1.6 ug/L) in SE corner
• Xylenes: Detected in 12 samples (1.1 - 1.3 ug/L) throughout site
• TCF: Detected in 3 samples (4 - 78 ug/L) in SE corner of site
• PCE, TCE, DCE, and TCF detected at depths up to 50 feet
Johnson/Ettinger Modeling

- Conducted using site specific soil parameters, assumed exposure of 250 days/year for 25 years
- Cumulative cancer risk $0.99 \times 10^{-6}$
- Hazard quotient below 1
Soil samples for VOCs

- Associated soil results below direct contact screening criteria, except for:
  - SB 119: PCE = 1,400 ug/kg at 9.5-10’ (criteria = 1,300 ug/kg)
- No correlation between soil gas and soil concentrations, however if soil was above direct contact, soil gas was detected
Additional VOC sampling

• Additional soil and groundwater sampling conducted following initial soil gas investigation
  – 10 borings from 80-120’
  – 2 borings installed as wells in Southeast corner
Shallow (<10 ′) soil sampling results

- Detected concentrations generally matched previous round, with hot spot around SB119 further delineated
- PCE: 4.8 -1500 ug/kg. Small area above direct contact screening level of 1,300 ug/kg (approx 3000 CY)
- All other VOCs below direct contact values
  - TCE: ND – 210 ug/kg
  - DCE: Only detected in SB 132, max 6.2 ug/kg
  - Cis-DCE: Detected in 3 borings, 6.1-28 ug/kg
SOIL ISOCONCENTRATION MAP
PCE IN SOIL AT 9.5 - 10 FEET DEPTH (ug/kg)
Deeper soil sampling results

- PCE: ND - 2,500 ppb
- TCE: ND - 220 ppb
- DCE: ND – 120 ppb
- Cis DCE: ND – 13
- Highest hits found in clayey materials
- Clayey materials does not appear to be an impermeable aquitard
- Low levels extend to 100’ bgs
Groundwater pathway

- Vadose zone leaching model (VLEACH) done to simulate vertical mobilization/migration to groundwater
  - 1-D finite difference
  - Allows for advection and diffusion
  - Degradation, production and dispersion neglected
  - PCE modeled using conditions at MW-1 and MW-2
  - Recharge rate varied from 0.025 - 0.5 ft/yr
Cases modeled

- Case 1: Concentrations in 2 clay layers included using constant PCE values (59 and 69 feet bgs)
  - Max MW-1 Case 1A: 84 and 150 ppb
  - Max MW-2 Case 1A: 2200 and 36 ppb

- Case 2: Concentrations in clay and silty clay layers modeled at varying concentrations (4, 9, 19, 29, 59, and 69 feet bgs)
  - Max MW-1 Case 2A: 190, 67, 1000, 660, 84 and 150 ppb
  - Max MW-2 Case 2A: 1500, 1400, 180, 2200, 36, and 3.8 ppb
MW-1 modeling results

- Leachate concentrations below MCL
  - Case 1A: Max = 0.8 ppb at 100 year duration with recharge of 0.5 ft/yr
  - Case 2A: Max = 3.5 ppb at 100 year duration with recharge of 0.5 ft/yr
MW-2 results

• Leachate above MCL in Case 1A and 2A
  – Case 1A: Max = 5.3 ppb at 100 year duration with recharge of 0.5 ft/yr
  – Case 2A: Max = 8.8 ppb at 100 year duration with recharge of 0.5 ft/yr
On site GW sampling

- MW-1 and MW-2 installed underlying areas with higher soil contamination
  - MW-1 screened 99-119’ bgs
  - MW-2 screened 100-120’ bgs
- Groundwater flow generally W to NW on site
- Concentrations lower than detected in regional well FM-5

<table>
<thead>
<tr>
<th></th>
<th>PCE</th>
<th>TCE</th>
<th>DCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCL</td>
<td>5</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>MW-1</td>
<td>10</td>
<td>33</td>
<td>5.5</td>
</tr>
<tr>
<td>MW-2</td>
<td>3.7</td>
<td>23</td>
<td>7.4</td>
</tr>
</tbody>
</table>
Regional GW data

- FM-5 (SW corner of site) sampled since installed in 1992
- Well screened at 121-141 feet bgs
- TCE, PCE, and DCE all above MCL (except DCE in latest sample)
- General increasing trend over time
- No data from F-KIM1A
Orange County Water District North Basin Groundwater Protection Project (NBGPP)

- Initiated in 2005 to contain movement of industrial contamination before it threatens additional parts of GW basin
- Installation of extraction and monitoring wells
- Purification plant and containment system recirculating in the shallow aquifer
Info on Fullerton Business Park
OC WA plan for addressing regional plume
Property Transfer

- Johnson Controls Shut down operations and demolish site
- Sample following demo in waste treatment area
- Conduct remediation
- Turn over clean, dirt site to Lowe
- Lowe develops site in two phases
Future Site Development

NOTE:
THIS CONCEPTUAL DESIGN PLAN IS BASED UPON A PRELIMINARY REVIEW OF ENTITLEMENT REQUIREMENTS AND IS UNWRITTEN AND POSSIBLY INCOMPLETE SITE INFORMATION, AND IS INTENDED MERELY TO ASSIST IN EXPLORING HOW THE SITE MIGHT BE DEVELOPED.

CONCEPTUAL SITE PLAN
KIMBERLY BUSINESS CENTER