Managing Decision Uncertainty

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Triad site assessment method leads to discovery of groundwater contamination source, an unsecured vat containing dichlorobenzene (photo by Jeong Seop Shim) at a Brownfield Redevelopment Site. Several days of intensive groundwater testing (50 grab samples from 40 locations) led investigators to the source of dichlorobenzene contamination. Sampling conducted by S2C2, Inc.

Smarter, faster, better technologies and work strategies are the goal of a new approach to hazardous waste site remediation. The three-pronged approach, called Triad, emphasizes systematic project planning, dynamic work strategies and real-time measurement technologies. The EPA-endorsed Triad approach was the subject of an evening workshop on managing decision uncertainty for better cleanup projects.

"Managing decision uncertainty is the way to build self-correction into the environmental contamination assessment system," says Deana Crumbling of the EPA Office of Superfund Remediation and Technology Innovation in Washington, D.C. Making decisions and adapting to new information during site assessment and cleanup is an unavoidable part of the process, Crumbling explained during her presentation. Mother Nature is messy and idealized models usually don't reflect the real world.

Triad copes with the inherent heterogeneity of the environment by employing an approach resembling the scientific method in which a good, thoroughly deliberated hypothesis is essential. In Triad, the hypothesis takes the form of a conceptual site model (CSM), which is constructed based on cleanup goals and what is known about the contaminated site. The CSM is then "tested" in the field once site assessment and remediation efforts commence.

"A good Triad approach is one that successfully employs an 'if-then' approach," says David Miller of the Environmental Assessment Division of Argonne National Laboratory. *If* data gathered on-site support the CSM, *then* the remediation activities continue as planned. If the data contradict the CSM, then just like an experimenter's hypothesis, the CSM must be updated and remediation activities redirected to reflect the new information.

Proponents can cite a litany of examples in which the Triad approach has reduced the time and expense of site cleanup: brownfields in New Jersey, an Army base in Virginia, a power plant in Connecticut, an agricultural site in Washington, and the list goes on.

The EPA expects to institutionalize Triad, and the agency anticipates that its principles will guide the way that data are collected and analyzed for future site cleanup decisions. However, the Triad approach represents a paradigm shift away from conventional approaches to project management. At the close of her presentation, Crumbling, cited an English economist who remarked that a paradigm shift is never without resistance. "The difficulty lies, not in the new ideas, but in escaping the old ones," she concluded.

For more information on Triad see: www.triadcentral.org

By Loren Walker www.L2W.cc