DOE-EM Soil and Water Assistance Team: Technical Support to Complex Sites

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The Savannah River Site has an established history of developing implementable risk reduction strategies, developing and deploying innovative technological solutions, and collaboratively achieving realistic and protective environmental end states for complex environmental problems. Part of this success results from the strong historical collaboration between site environmental restoration groups and the Savannah River National Laboratory which results in the promulgation of innovative technical approaches and technologies from the laboratory to ongoing remediation campaigns. Much of the underlying research and development effort was funded by DOE's Office on Environmental Management through a series of applied technology demonstration projects (Integrated Demonstration Project, Integrated Programs and the Applied Field Research Site). Concomitant with the research efforts, SRNL has managed a dynamic and efficient national program that provides teams of technical experts with a broad experience base to recommend strategies that reduce risk and/or technical uncertainty for challenging environmental problems at other DOE facilities. At many of these sites, standard remedial approaches (e.g., excavation, pump and treat, soil vapor extraction) have either failed or proved to be too costly, inadequate, or ineffective. Alternatively, other sites struggle with implementation of innovative but less well understood approaches. The technical assistance teams use a structured process that based on several basic concepts, specifically, development of site specific technical frameworks, and careful matching of remedies to site-specific chemical, geological and physical conditions. Development of technical frameworks is a key strategy to apply basic science to an applied field problem. When directed toward understanding complex real-world environmental remediation challenges, frameworks are tools that support practical identification and incorporation of the key-controlling scientific processes and principles. Frameworks can also be used to minimize technical risks, encourage efficiency and effectiveness, and provide the basis for innovative and creative solutions. Efficient and effective environmental cleanup also requires matching the character of remediation and stabilization methods to the nature of the target zone of contamination as the nature of the target zone evolves through the life of the remedial project. A contaminant plume can be divided into the following zones: the source zone, the impact zone, and the transitional zone that then can be used to identify classes of technologies that are appropriate to that zone. For example, physical and chemical methods (e.g., trapping, immobilization, destruction, or isolation) that directly address the source contaminants are often appropriate for the disturbed zone during the remedial process. A variety of methods that include both active treatments (e.g., pump and treat or active bioremediation) and enhanced attenuation technologies (e.g., geochemical manipulation or reactive barriers) are often suitable for the primary contamination zone or impact zone. Various strategies based on natural attenuation processes may be applicable to the primary contamination zone and these methods are typically applied for the transition or baseline portions of the plume. Careful matching of remedies to site-specific conditions is critical to long-term success in environmental cleanup and restoration. The matching process facilitates selection of technologies with particular strengths that align with real-world needs and constraints, encourages strategic use of multiple or combined technologies to address major plume subdomains, and supports transitioning technologies in space and time as remediation progresses. Since 2006, the SRNL Technical Assistance program has focused on providing support across the DOE complex. During this time, over 25 teams have visited eleven DOE sites and made recommendations that yielded an estimated cost savings of $100M. Examples will be provided that illustrate key aspects and significant successes of the technical assistance program.