Value-Added Site Monitoring & Infrastructure Maintenance for In-Situ Bioremediation

Cleanup
CU-1080

RESEARCH CATEGORY: 6.3 Advanced Development

LEAD AGENCY: U.S. Environmental Protection Agency

LAB: University of Michigan, National Center for Integrated Bioremediation Research & Development - Oscoda, MI

PRINCIPAL INVESTIGATOR: Dr. Michael Barcelona (313) 763-6512

FY 1999 FUNDS: $225K

OBJECTIVE: The objectives of this project include: the continued serial monitoring of intrinsic bioremediation processes at three fuel and solvent contaminated sites at the former Wurtsmith Air Force Base; the support, maintenance, and supplementation of the data in a relational database management system (RDBMS); and the statistical analysis of the data for spatial and temporal variability, estimates of mass removal rates and indicators of bioremediation process change.

BENEFIT: The project will provide direct benefit to Department of Defense (DoD), Department of Energy (DOE), and Environmental Protection Agency (EPA) by: 1) providing comprehensive field data for intrinsic remediation modeling efforts; 2) allowing more cost effective long term monitoring designs to be developed; and, 3) improving basis for collaboration among technology developers which will mean less redundancy between efforts. An overall benefit will be more cost-effective designs and performance goals for bioremediation of contaminated sites.

TECHNICAL APPROACH & RISK: The technical approach consists of a phased approach to the objectives outlined above. State of the art contaminant and geochemical ground-water monitoring will be continued on a quarterly basis at three fuel and solvent contamination sites which have distinct oxidation-reduction zones. Indicators of corresponding bioremediation indicators and the mass of contaminants associated with aquifer solids will be determined as well. Additional, statistical analyses of the time-series and spatial distribution of contaminants and geochemical conditions will be evaluated for sources of error and variability. Bioremediation performance indicators will be developed in selected oxidation-reduction zones. Several years of data exist for the three study sites which will provide a basis for the use of RDBMS and results of the statistical analyses by leading bioremediation modeling and remedial design groups.

ACCOMPLISHMENTS: Internet (internal) and an external web page have been established. Field data has been updated and made more accessible. Laboratory and associated QA/QC data was completed. Presentations and poster sessions on data quality, petroleum hydrocarbon source strength estimates, and temporal variability of bioremediation indicators have been made. Peer-reviewed papers have been drafted on the latter issues. Permission was granted to proceed with the second tracer test. Negotiation with potential sponsors of the MIRTL2 Natural Gradient Tracer Test proceeded with encouragement.

TRANSITION: The results of the continued serial monitoring of intrinsic bioremediation processes will be made widely available to facilitate transition of the project's efforts. The various efforts to ensure

dissemination of information will enable further usage by DoD and DOE site managers.