

Deployment of *In Situ* Bioremediation and Monitored Natural Attenuation as the Final Remedy for Restoration of Chlorinated Solvent Contaminated Groundwater

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Test Area North at the Idaho National Engineering and Environmental Laboratory (INEEL) is the site of a 2 mile long trichloroethene groundwater plume resulting from historical injection of wastewater into the Snake River Plain Aquifer. The 1995 Record of Decision (ROD) identified pump and treat as the default remedy for total plume restoration. However, the authors of the ROD recognized that this technology may not be the most effective remedy and identified five innovative technologies to be evaluated to determine if overall plume restoration could be enhanced relative to traditional pump and treat. Completion of the technology evaluations resulted in regulatory agency selection of In Situ Bioremediation (ISB) and Monitored Natural Attenuation (MNA) as more cost- and time-effective remedies for two different plume zones. Innovative technology selection was based on 5 years of INEEL technology evaluation conducted in parallel with two and one half years of Subsurface Contaminants Focus Area (SCFA) deployment activities. The major achievements supporting selection of ISB and MNA were:

- Demonstrated groundwater restoration COST SAVINGS at INEEL of \$23 Million
- Demonstrated SOURCE AREA RESTORATION with ISB
- Demonstrated use of MNA for dissolved phase remediation
- REGULATORY ACCEPTANCE of ISB & MNA for Chlorinated Solvent Remediation
- PUBLIC REVIEW & ACCEPTANCE of Proposed Plan for final selection of ISB and MNA
- RECORD OF DECISION AMENDMENT Draft Final
- Provisional PATENT APPLICATION related to ISB filed June 2000
- R&D 100 AWARD NOMINATION from INEEL December 2000
- Active DEPLOYMENT of ISB and MNA to LLNL, ORNL Y-12, Portsmouth
- INEEL innovative technology expertise supported SCFA Technology Assistance efforts

The INEEL team has deployed two innovative technologies using a successful process model demonstrating cost- and time-effective alternatives to pump and treat are available for restoration of chlorinated solvent contaminated groundwater.