

Idaho National Engineering & Environmental Laboratory
Bechtel BWXT Idaho LLC.

VERTICAL PROFILE SAMPLING

Summary:

Vertical profile sampling is a sampling technique that allows the vertical extent of contamination to be identified in an aquifer monitoring well. The deployment involves installing barriers at different depths within a well.

Vertical profile sampling is identified in the OU 1-07B ROD Amendment as a required component of the Natural Attenuation monitoring program. Vertical profile sampling is used to determine the vertical distribution of contaminants within the plume. This three dimensional contaminant distribution data can be used to verify that degradation has occurred as predicted. Three different vertical sampling strategies will be tested to determine the most cost effective approach to long-term monitoring.

This deployment will produce cost savings, reduce programmatic risk, improve worker safety, and reduce sampling schedules while providing the required technical adequacy to support periodic remedy performance reviews.

The deployment also helps satisfy STCG need 6.1.39 (Long-Term Subsurface Engineering Structures and Monitoring Methods for Permanent Control of Waste Left in Place).

Qualitative Benefit Analysis

Programmatic Risk	● Use of vertical profile sampling will reduce programmatic risk by providing an additional tool to demonstrate to the regulators that natural degradation has occurred. There are currently no direct measures of the natural attenuation process. As a result the performance review process depends on a "Weight of Evidence" argument to evaluate success. Vertical profile data collection and analysis provide one more tool to build the "Weight of Evidence."
Technical Adequacy	● Collecting vertically discrete samples in an open borehole is a challenging task. The OU 1-07B team has tested two different strategies and will test a third in FY 2002. The first two techniques proved to be either difficult to use in the field or labor intensive. The third technique, deployment of 5 FLUTE liner systems, will address both issues while providing the strongest technical approach (isolates sampling intervals better than the first two techniques).

Safety	 <p>Use of the FLUTE Liner system will improve safety by decreasing the time personnel need to spend in the field collecting samples. Actual time reduction will be determined in FY 2002 but is expected to be roughly 25% of the time required for the first two techniques tested.</p>
Schedule Impact	 <p>Overall remediation schedule will not be affected by use of vertical profile sampling. However, there will be significant improvement in sample collection schedules in any year vertical profile sampling is conducted. This will lead to cost savings for the project.</p>

				
Major Improvement	Some Improvement	No Change	Somewhat Worse	Major Decline

Quantitative Benefit Analysis							
Cost Impact Analysis	<p>Cost benefits relative to the first two technologies tested will be realized each time FLUTE liner vertical profile sampling is conducted. A decision has not been made at the present time regarding the frequency and long-term use of vertical profile sampling. As a result life-cycle cost savings and a final return on investment cannot be estimated. Based on costs for deployment of the first two technologies the annual savings are estimated at \$100 to \$150 K per year. This represents a 50% to 75% reduction in annual vertical profile sampling costs.</p> <table> <tr> <td>Annual Savings</td> <td>~ \$125,000</td> </tr> <tr> <td>Life Cycle Cost Savings (10 yr.)</td> <td>~ \$1,250,000</td> </tr> <tr> <td>Return-On-Investment (ROI)</td> <td>XX %</td> </tr> </table>	Annual Savings	~ \$125,000	Life Cycle Cost Savings (10 yr.)	~ \$1,250,000	Return-On-Investment (ROI)	XX %
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**SCIENCE AND TECHNOLOGY BENEFIT ANALYSIS
DEPLOYMENT APPROVALS**

Technology Deployed: VERTICAL PROFILE SAMPLING

Date Deployed: 12/15/00

EM Program(s) Impacted: Environmental Restoration Program

Approval Signatures

Lee Sude 8/21/01
Contractor Program Manager Date

N/A
Contractor Program Manager Date

Kathleen E Heim 8/23/01
DOE-ID Program Manager Date

N/A
DOE-ID Program Manager Date