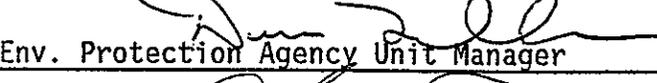


Control Number: BHI 00171	200 NPL Agreement/Change Control Form  <input type="checkbox"/> Change <input checked="" type="checkbox"/> Agreement <input type="checkbox"/> Information Operable Unit(s): 200-ZP-1	Date Submitted: 02/01/95 Date Approved: 02/01/95
Document Number/Title: BHI-00154, Integrated Test Plan <i>In-Situ Bioremediation Demonstration</i>		Date Document Last Issued: 1/13/95
Originator: J. G. Zoghbi		Phone: (509)376-0940
<p>This form documents resolution of regulatory issues related to RD&amp;D treatability activities for the In Situ Bioremediation technology demonstration which will be conducted by a Pacific Northwest Laboratory (PNL) Principal Investigator supported by Bechtel Hanford, Inc. (BHI). The planned activities will include controlled injection of nutrients and/or non-toxic tracer, and continuous recirculation of groundwater between two or more of the following adjacent wells: 299-W11-29, 299-W11-30, 299-W11-32, 299-W11-33, 299-W11-34 and 299-W11-35. The demonstration will provide design, operating, and cost information for use in examining bioremediation as a treatment option for the carbon tetrachloride (CCl<sub>4</sub>) and nitrate groundwater plumes at the Hanford Site. A description of the test was included in the <i>Integrated Test Plan: In Situ Bioremediation Demonstration</i>, BHI-00154, which was forwarded January 19, 1995 to the Environmental Protection Agency and Washington State Department of Ecology.</p> <p style="text-align: right;">(Continued on next page)</p>		
Justification and Impact of Change: This form documents the resolution of all regulatory issues related to the characterization tracer test and confirms that the existing plans and proposed operations provide adequate protection for human health and the environment.		
 BHI 200 Area Project Manager		Date 2/1/95
 DOE Unit Manager		Date 2/1/95
 Env. Protection Agency Unit Manager		Date 2-1-95
 Ecology Unit Manager		Date 2/1/95
Per Action Plan for Implementation of the Hanford Consent Order and Compliance Agreement Section 9.3.		

Total Pages 3

BHI-DIS Co 2-1-95

These activities will be conducted to support potential remedial alternative actions for the 200-ZP-1 Operable Unit under the Comprehensive Environmental Recovery, Compensation and Liability Act of 1980 (CERCLA)(40 CFR §300.430). Actions conducted pursuant to this effort may constitute treatment of hazardous waste under the Resource Conservation and Recovery Act (RCRA) research, development and demonstration (RD&D) provisions. However, an RD&D permit is not required because CERCLA Section 121(f) requires no federal, state, or local permit be obtained for the portion of any removal or remedial action conducted entirely onsite. The RCRA RD&D regulations allow flexibility within the substantive provisions of RCRA so that innovative technologies may be tested and developed. It should be noted that these activities must still comply with the substantive portions of applicable environmental laws related to the technology demonstration activities.

The Department of Energy, Richland Operations Office, will conduct these operations in a manner which will be protective of human health and the surrounding environment. A spill response plan has been developed which includes having spill response kits on-site as well as a list of emergency response contacts in case an unplanned release should occur. The system uses schedule 40 metal pipe and operates under low pressure (less than 50 psig). The potential for significant groundwater leaks is very low. The test equipment uses a computer control system for unattended 24-hour operation. The system automatically telephones on-call staff in the event of a deviation from set-point pressures and flow. Additionally, if flow and pressure sensors indicate a major leak, the system will automatically cease pumping. To ensure protection of the environment during these studies, a secondary containment system will be installed on the above-ground piping, at those locations where a leak could potentially occur (e.g., valves, fittings, joints). This will provide for collection of groundwater, especially during unmanned hours, in the unlikely event that a leak does occur.

Actual treatment processes will occur in situ rather than above ground. The test results will provide data regarding the effectiveness of the treatment that can be used in the future to evaluate efficacy in respect to some applicable or relevant and appropriate requirements (ARARs). All ARARs are not required nor anticipated to be met at this time due to the limited scope of this action in the overall effort. However, since the bioremediation test is in support of a selection of a final remedy, overall attainment of ARARs will be addressed in the final remedial decision.

The test will extract and reinject  $CCl_4$ -contaminated groundwater (nominally 2 parts per million). Because the planned treatment zone will be developed *in situ*, the concentration of contaminants extracted and injected will be the same and should decrease with time as the water circulates through an engineered bioactive zone. The daily reportable quantity (RQ) for  $CCl_4$  is currently 10 pounds, which is equivalent to over 500,000 gallons of water contaminated at the existing concentration. Discharge to the aquifer from the recirculation of  $CCl_4$ -contaminated groundwater is planned at 30 gallons/minute (less than 50,000 gallons/day). The nutrients, acetate and nitrate, will be injected into the aquifer to begin active bioremediation. Acetate and nitrate

will be injected separately into the aquifer in pulses of 0.5- to 2-hour duration at a frequency of 5 to 24 hours. There is no RQ for acetate. The final RQ for nitric acid is 1,000 pounds. Less than 22 pounds/day of stock nitric acid is planned for maintaining bioremediation. Sodium nitrate may be used to supplement nitrate concentration while maintaining favorable pH. Diluted nitrate pulses will range between 0 and 10,000 mg/L. The maximum concentration of nitric acid in the pulse after injection will be 200 mg/L as nitrate (pH 2.5).

It is agreed that recirculation activities may proceed as planned and the groundwater may be reinjected without treatment within the area of contamination at the designated site. Any investigation-derived waste, to include extracted groundwater which is not part of the test itself, will be handled in accordance with applicable regulations.