# APPENDIX F

# EXISTING NEPA AND RELATED DOCUMENTATION

I. Representative NEPA Documentation for the Activities Similar to NABIR Proposed Research

1. NEPA Determination for Proposed Flow-Cell Installations and Tracer Experiments, South Oyster Field Site, Northampton County, Virginia
   a. Environmental Evaluation Notification Form for Flow-Cell Installations and Tracer Experiments, South Oyster Field Site, Northampton County, VA
2. Environmental Assessment Executive Summary for Dover Air Base, Dover Delaware

II. Representative NEPA Documentation for Oak Ridge National Laboratory

1. Categorical Exclusion for Small-Scale Research and Development Projects and Pilot Studies conducted by ORNL Environmental Sciences Division
2. a. NEPA Review Report for *In Situ* Permeable Reactive Barriers for Metals and Radioactivity: Sampling and Dye Tracer Study
   b. Categorical Exclusion for *In Situ* Permeable Reactive Barriers for Metals and Radioactivity: Sampling and Dye Tracer Study
   c. Tracer Test Workplan for *In Situ* Permeable Reactive Barriers for Metals and Radioactivity: Sampling and Dye Tracer Study
3. a. NEPA Review for Y-12 Plant Multiple Tracer Injection Test
   b. Work Plan for Y-12 Plant Multiple Tracer Injection Test
   c. Voluntary Tennessee Department of Environment and Conservation Dye Tracer Registration Form for Y-12 Plant Multiple Tracer Injection Test

III. Representative NEPA Documentation for the Hanford Site, Richland, Washington

1. Categorical Exclusion for Determination for Site Characterization and Environmental Monitoring, Hanford Site, Richland, Washington
2. Categorical Exclusion Determination for Microbiological and Biomedical Research Projects, and Diagnostic and Treatment Activities, Hanford Site, Richland, Washington
3. Categorical Exclusion Determination for Palouse Drilling Project Located Near Winona and Washtucna, Washington.

## I. Representative NEPA Documentation for Activities Similar to NABIR Proposed Research

**Department of Energy**
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

OCT 1 1998

Paul E. Bayer
NABIR Field Research Center
Manager, HQ
ER-74/GTN

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION FOR PROPOSED FLOW-CELL INSTALLATIONS AND TRACER EXPERIMENTS, SOUTH OYSTER FIELD SITE, NORTHAMPTON COUNTY, VIRGINIA

The activities for the proposed flow-cell installations and tracer experiments located at the South Oyster Field Site, Northampton County, Virginia, have been evaluated for potential environmental impacts.

NEPA review for characterization studies (Gold-0020, Gold-0020-Modification 1, and Gold-0020-Modification 2) were conducted prior to the selection of the South Oyster Field Site. Consequently, general environmental issues have already been addressed for this Site. The proposed action submitted for the current determination is to conduct a research study of bacterial transport in a subsurface aquifer under both aerobic and hypoxic conditions. The property on which the proposed research will take place belongs to the Nature Conservancy and is part of the Virginia Coast Reserve. The proposed field work will be conducted on the edges of actively cultivated fields. Prior to conducting any research on this Site, the Nature Conservancy has required that a Research Permit Application be submitted and approved. The project managers have met all the rigorous requirements and environmental constraints, consequently, a research permit to conduct the studies has been issued.

No environmental impacts would occur to (or result from): threatened/endangered species and/or critical habitats; archaeological/historical resources; prime, unique, or important farmland; special sources of groundwater; coastal zones; the floodplain; noise; and hazardous, toxic, or criteria pollutant air emissions. There is no threatened violation of Environment, Safety & Health regulations/permit requirements at the South Oyster Field Site.

Based upon my review of the data presented in the Environmental Evaluation Notification Form, I have determined that the proposed action is covered by Categorical Exclusion B3.6 (Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects) and B3.8 (Outdoor ecological/environmental research in a small area). No further NEPA review nor documentation is required for the proposed actions at the South Oyster Field Site, Northampton County, Virginia.

Signature: W. Sedgefield White
Chicago Operations Office NEPA Compliance Officer

Date: October 1, 1998

cc: C. Hickey, HQ, ER-8.2/GTN
W. Timothy Griffin, Golder Associates, Inc.
F. Wobber, HQ, ER-74/GTN
M. Broido, HQ, ER-74/GTN
J. Houghton, HQ, ER-74/GTN

## ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: Golder Associates Inc.; South Oyster Field Site, Northampton County, VA

Project/Activity Title: Flow-Cell Installations and Tracer Experiments, South Oyster Field Site, VA

CH NEPA Tracking No.:
B&R Code:

Type of Funding: Energy Research
Total Estimated Cost: $150,000 (field work alone)

DOE Cognizant Secretarial Officer (CSO):

Contractor Project Manager: W. Timothy Griffin Signature: W. Timothy Griffin

Date: 9/16/98

Contractor NEPA Reviewer: W. Timothy Griffin Signature: W. Timothy Griffin

Date: 9/16/98

## I. Description of Proposed Action:

### Introduction

This Environmental Evaluation Notification Form (EENF) is being submitted in support of a bioremediation field research project funded by the U.S. Dept. of Energy, Office of Biological and Environmental Research. The purpose of the proposed research project is to study bacterial transport in a subsurface aquifer under both aerobic and hypoxic conditions. A site with these conditions has been identified and characterized on the Delmarva Peninsula near the small fishing village of Oyster, Virginia (Figures 1 and 2). The work to date that has been performed to select and characterize this site was described in EENF's Gold-0020, Gold-0020-Modification 1, and Gold-0020-Modification 2. The property on which the site is located is owned by The Nature Conservancy (TNC), and is part of the Virginia Coast Reserve. The site is herein referred to as South Oyster.

The proposed research is funded by DOE's Natural and Accelerated Bioremediation Research (NABIR) Program. The factors controlling transport of bacteria are important for the field scale application of bioremediation technologies, however, research on microbial transport in the presence of complex subsurface heterogeneity is limited. The purpose of this research program is to focus on the physical and chemical factors which control microbial transport in the subsurface.

An interdisciplinary research team has been assembled to conduct this research. Principal Investigators (PIs) on this team include:

Dr. T.C. Onstott, Princeton University
Dr. Mary F. DeFlaun, Envirogen, Inc
Dr. Donald Swift, Old Dominion University
Dr. William Holben, University of Montana
Dr. Timothy Scheibe, Pacific Northwest National Laboratory
Mr. Timothy Griffin, Golder Associates
Dr. Timothy Ginn, University of California, Davis
Dr. David Balkwill, University of Florida
Dr. Jim Fredrickson, Pacific Northwest National Laboratory
Dr. Tommy Phelps, Oak Ridge National Laboratory
Dr. Chris Murray, Pacific Northwest National Laboratory
Dr. Phil Long, Pacific Northwest National Laboratory
Dr. Ernie Majer, Lawrence Berkeley Laboratory
Dr. Susan Hubbard, University of California - Berkeley

Princeton University, under a grant to Dr. T.C. Onstott, is serving as the lead institution for the research program, and represents the multi-disciplinary team in all issues requiring regulatory input or approval.

In addition to the list of collaborators provided above, there are other PIs in the NABIR program that are interested in obtaining samples from the South Oyster site, and additional PIs may be added to the team as research proposals to the NABIR Program are submitted and approved. The activities of all of these researchers will be coordinated by Dr. T.C. Onstott of Princeton University and Dr. Mary F. DeFlaun of Envirogen, Inc. This research is currently funded through FY 2001.

Generally, the environmental issues to be addressed in this EENF for the work proposed at South Oyster have been addressed previously in EENF's Gold-0020, Gold-0020-Modification 1, and Gold-0020-Modification 2. The proposed activities that require additional documentation include the installation of flow-cells, the extraction and re-injection of unconfined groundwater in flow-cells, the re-injection of indigenous microorganisms into the unconfined aquifer, and the injection of chemical (bromide) tracers into the same aquifer. These activities required a Research Permit from The Nature Conservancy, and a Variance to Virginia Groundwater Quality Standards from the Virginia Department of Environmental Quality (VaDEQ). These documents are included as Attachments 18 and 21 respectively, with additional explanatory text.

**Work To Be Performed**

The field work that is to be conducted at the South Oyster site over the course of the field research program can be grouped into five categories. Descriptions of these five categories of activities are provided below.

***Category 1: Flow Cell Installations***

Two flow-cell installations are currently planned for the South Oyster site over the duration of the project (Figure 2). The first will be installed in the northeastern-most corner of the field near Narrow Channel where groundwater is aerobic. The second will be in the northeastern region of South Oyster Focus Area, within 100 meters of the street that runs along the southern perimeter of the village of Oyster. Groundwater in this region is hypoxic. Flow cell installations will take place on separate occasions, each with a duration of approximately 1 to 2 weeks. The first is planned for September of 1998, and the second is projected for some time in early 1999.

The principal framework of each flow-cell is a 20 m x 30 m grid of nine injection/extraction wells arranged in a 3 well x 3 well pattern (Figure 3). These wells will be installed in the uppermost unconfined aquifer at a depth of approximately 10 m below ground surface (bgs). Downgradient from the central injection wells is an array of multi-level samplers (MLSs), as illustrated in Figure 4. Each MLS will have ten to fifteen downhole sampling ports set at even spacing between approximately 6 to 9 m bgs. Precise depth settings for the MLSs will be determined based on field data collected during the installation of the nine injection/extraction wells. Additional details on the MLS installation are provided in the description of the Category 5 activities. In addition to the injection/extraction wells and the MLSs, 4 monitoring wells will be installed within the boundaries of the flow-cells (Figure 3), and at least 4 boreholes will be installed for borehole tomography (Figure 4).

None of these installations will be any deeper than 10 m bgs. Each well-head will extend approximately 2.5 ft above ground surface and will be encased in protective, locking casing (probably PVC tubing) approximately 8 to 10 inches in diameter.

Each hole that is drilled for wells and borehole geophysics will be continuously cored. Core samples will contained in lexan liners, from which subsamples will be selected and distributed to the various laboratories and PIs identified previously. In addition, groundwater samples will be collected periodically from the wells and the MLSs for chemical and microbial analyses, and for monitoring the groundwater quality as required by TNC and VaDEQ.

Equipment that will be required on site during installation will include one (1) roto-sonic drilling/coring rig and a support truck, a personnel truck, and 2 to 3 vehicles for participating program investigators. There will also be a small temporary "lay-down area"

of no more than 10 meters x 10 meters on the perimeter of the site for storage of drilling and sampling equipment and well construction materials during the field program.

Activities will only be conducted during daylight hours. Noise levels, while requiring hearing protection adjacent to the drilling rig, should not create any concern for the nearby residences.

Access to each flow cell will be from the Village of Oyster. The Narrow Channel Focus Area will be accessed by a path that extends through the field from the old homestead property in the center of the field just south of Oyster. This will avoid traffic across private property at the western margin of the field along Seaside Road. Access to the South Oyster Focus Area will be from the road on the south side of town.

*Category 2: Excavation at the Narrow Channel Focus Area*

Additional excavations along the bank of Narrow Channel Branch are currently anticipated over the course of the project. The first of these excavations was addressed in Modification 2 to EENF Gold-0020, and was conducted in August of 1998. This same excavation site may be reopened from time to time during the course of the project, depending on the research needs of the program. The purpose of these excavations is to provide a 3-dimensional exposure of the sedimentary facies that comprise the nearby flow-cells, and to provide an opportunity for detailed sampling of these facies.

The excavation site is approximately 20 meters by 15 meters, and reaches a depth of approximately 3 meters. The excavated face was tiered such that no vertical face exceeded 1.5 m in height. All slopes met or exceeded OSHA requirements of 1.5:1 (horizontal:vertical) for the soil type in this area.

Samples collected from the vertical face will include a variety of grab samples, including 70 cm long x 7.6 cm diameter cores, grab samples, and syringe samples.

Future excavations will require either one (1) excavator or backhoe, which will be delivered to the site on a flatbed truck/trailer. Support equipment at the site will include vehicles for field personnel. Proper erosion control procedures (silt fencing, hay bales, re-seeding) were employed previously at the site, and will again be implemented during future excavations.

Excavation sampling programs will last an average of 1 week. Immediately upon completion of the excavation sampling activities, the site will be backfilled, compacted, and re-seeded. Silt fencing and hay bales will remain in place for erosion control until native and seeded grasses are re-established.

*Category 3: Additional Selective Sampling and Characterization*

Some additional sampling and characterization may be required at the site for detailed correlation between the two flow-cell areas. This work will likely be performed in a similar manner to previous work done at the site by cone penetrometer testing (CPT), which requires a CPT truck, as well as a support truck and trailer. Additional support vehicles include two to three automobiles for participating investigators. Some limited roto-sonic drilling and coring may also be employed. In both cases, boreholes will either be backfilled or shallow monitoring wells will be installed, both in accordance with Virginia Department of Health guidelines.

One or two campaigns are anticipated over the course of the project of approximately 1 week duration; however, no additional CPT or roto-sonic field work has been specifically scheduled at this time.

*Category 4: Tracer/Microbial Injections and Sampling*

Three to four injection/sampling events are currently anticipated over the course of the project, the first anticipated some time before the end of 1998 at the Narrow Channel Focus Area. Equipment required on site for these activities include a diesel or gas powered generator (provided power is not made available), two pumps to simultaneously inject and extract groundwater, and two large volume (300-500 gallon) carboy tanks for water storage and injection preparation. This equipment will likely be stationed on two small flatbed trailers of 15 to 20 ft in length. During microbial and tracer injection experiments, up to 10 peristaltic pumps will be used to extract groundwater from the MLSs. Extracted volumes will be relatively small - approximately 1 liter per sampling port.

Additional support equipment will include vehicles for participating investigators.

The injection/sampling experiments will be conducted around the clock for a period of 1 to 2 weeks. Personnel will be required on site during the night, so some minimal lighting will be required (lanterns, etc.). Every effort will be made to minimize traffic, noise, and light pollution during these experiments.

> **Note:** Due to the considerable number of samples that must be collected during these experiments (estimated 21 MLSs x 10 samples per MLS), an automated sample collection system is being considered for each flow cell. In the event the automated system is employed, the equipment will be housed in a small (est. 8 ft x 8 ft) temporary building constructed near the center of each flow cell. This building would be constructed in accordance with environmentally sensitive guidelines provided by TNC.

*Category 5: Multi-level Sampler Installations*

An array of approximately 21 multi-level samplers (MLS's) will be installed just downgradient of the central injection well inside each flow-cell (Figure 4). The surface expression of each MLS will be a bundle of 10 to 15, 3/8-inch diameter poly tubes with swage-lock fittings and caps on each end. Each bundle will be attached to a central, ½-inch diameter PVC pipe, which will all be encased inside locking protective casing (PVC), approximately 8 to 10 inches in diameter, that extends no more than 3 ft above ground surface.

Installation of the MLSs will require either a standard rotary drill rig or CPT rig, with one support truck and vehicles for participating investigators. Installation will take no more than 4 days to 1 week.

> **Note:** The MLS installations may actually occur during Category 3 sampling and characterization activities, provided CPT technology can be utilized.

Once each flow-cell is installed, fencing will be constructed around the perimeter of each site in accordance with TNC guidelines. Informational descriptions of the research program and the site will be placed at the entrance of each flow cell for purposes of educating the local citizens and visitors on the objectives of the research program.

All site activities require laboratory space. In the past TNC has provided us the use of a house within the town of Oyster. This house provided adequate accommodations for our field laboratory, however, the future use of this house by TNC is uncertain. Therefore, it may be necessary to provide a laboratory trailer for use during field campaigns. The location of this trailer would be at the discretion of TNC.

**Site Monitoring and Contingency**

As stipulated by TNC's Research Permit (Attachment 18), a draft Monitoring and Contingency Plan was prepared that describes the short- and long-term monitoring protocols that will be implemented at the site. The draft Monitoring and Contingency Plan is included as Appendix A of Attachment 17, the draft Research Application submitted to TNC.

The focus of this monitoring program will be the microorganisms and tracers that are injected during the tracer injection experiments. In the event that levels of tracers or injected microorganisms exceed background at any time, VaDEQ and TNC will be contacted immediately and a contingency action will be determined at that time. IT IS IMPORTANT TO NOTE THAT NEITHER THE TRACER OR MICROORGANISMS THAT ARE TO BE INJECTED ARE LISTED CONTAMINANTS EITHER WITH VADEQ OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA).

Monitoring will continue for one year after the final injection experiment. Upon approval of TNC and VaDEQ, site closure will be conducted soon thereafter, which will include pulling and/or abandonment of all wells and restoration of the site to its condition prior to research program.

**Benefits to Virginia's Eastern Shore Communities**

*General Benefits*

In a general sense, this project will significantly enhance the understanding of the groundwater hydrogeological system that is a fundamental underpinning of the Eastern Shore ecosystem(s). The results of this multi-disciplinary research, both independently and when combined with that of others at Old Dominion University, the University of Virginia's Long-Term Ecological Research Program, and elsewhere, will form one of the most comprehensive studies of a groundwater system in a region this size anywhere.

*Specific Benefits*

With respect to specific contributions, TNC has expressed a particular interest in the impact of self-sustaining agricultural practices on groundwater quality and biodiversity in the region. In particular, nitrate and other chemical constituent levels in the Eastern Shore groundwater are of particular concern with respect to their potential impact on flora and fauna in low-lying areas. We believe that we can make a significant contribution to the understanding of this problem, and that the South Oyster site offers a unique opportunity to study the problem in both anoxic and aerobic environments. This is important, since models developed by the U.S. Geological Survey, and corroborated by our field work, indicate that anoxic and low DO groundwater conditions may be widely distributed at least in the southern portion of the Eastern Shore, particularly in the critical fringe areas of lowlands and wetlands that border creeks and marshes.

To begin to understand why nitrate is present in the groundwater it is necessary to understand the overall nitrogen cycle in the system. Microorganisms play a critical role in this cycle, both in anoxic and hypoxic environments. Depending on the environmental conditions (aerobic vs. hypoxic), nitrate is either produced or converted to nitrogen by microorganisms (nitrifiers and denitrifiers). Understanding the presence and interactions of the microbial community that produces these reactions is fundamental to assessing the naturally varying baseline concentrations of nitrate in the system. Comparison of data from both the aerobic and hypoxic environments will determine the limitations that exist on hypoxic nitrate reduction. Coupled with studies of how effective nitrate uptake is in plants such as warm season grasses, a more realistic picture can be developed as to the mechanisms of overall nitrate production/uptake in the groundwater.

Dr. David Balkwill of Florida State University and other program PI's will be determining the presence and relative abundance of nitrifiers and denitrifiers in both the aerobic and

hypoxic groundwater systems, and will assess the degree of nitrate production and/or reduction in these respective environments.

Plots of warm season grasses have already been planted in wide borders around the proposed flow-cell sites. These plots will not only serve as natural "blinds" for the flow-cells, but will also provide an opportunity to assess the potential for nitrate uptake by these grasses. Monitoring wells installed down-gradient from these plots will be monitored regularly for nitrate levels, as well as other chemical and microbial constituents. We will also work with the farmer, Ray Newman, to determine the spatial and temporal patterns of nitrogen data derived from the monitoring wells.

It is anticipated that nitrate transport at South Oyster should be more limited under the hypoxic conditions near the proposed site for South Oyster Focus Area flow-cell relative to the aerobic site adjacent to Narrow Channel. A determination of the effect of hypoxic groundwater on nitrate concentrations in surface water and groundwater could have tremendous implications for large scale ecosystem management in the region.

The groundwater chemistry in areas proximal to tidal marshes can be highly variable, reflecting the impacts of agriculture, marine precipitation events, and saline water encroachment. To better understand this complex "mixing" zone, water samples from monitoring wells on the perimeter of the hypoxic flow cell will be analyzed for inorganic and organic chemical constituents at regular intervals over a three year period. We also propose to collect precipitation samples for compositional analyses. This data set will yield a record of salinity fluctuations at this mixing interface, as well as the nutrients entering the marshes and creeks. Ultimately, these temporal and spatial variations can be correlated with changes in precipitation events, cultivation practices, water circulation during bacterial injections, and natural vegetation. These measurements could ultimately help define the geochemical factors that mitigate the expansion of Phragmites.

*Other Initiatives*

Program PI's will continue to look for opportunities where their scientific objectives can be integrated with the programmatic objectives of TNC. Dr. Mary DeFlaun of Envirogen, Inc. will continue to work with Ms. Terry Thompson, Director of Research and Education for the Virginia Coast Reserve (VCR), to identify such opportunities. Program PI's are also available for educational seminars and other community outreach programs.

Flow-cells will be constructed with sensitivity to the surrounding environment, and instructive plaques will be placed at the sites for the benefit of students, the community, and other TNC visitors.

*Public Information*

In cooperation with TNC information about this project has been presented to public officials and citizens in Northampton County. Specifically, the project has received the support of the Northampton County Board of Supervisors and the County Office of

Planning and Zoning, the Water Quality Consortium of Northampton County, and the Joint Industrial Development Authority of Northampton County. In addition to TNC, Mr. John Humphrey, the Director of Planning and Zoning for the County of Northampton will be informed of all activities at the site related to this project.

## II. Description of Affected Environment:

The South Oyster Site is located on the Eastern Shore of Virginia, near the southern end of the Delmarva Peninsula (Figure 1). It is identified on the USGS 7.5 minute Cheriton Quadrangle just to the south of the small village of Oyster (Figure 2). The property is owned by TNC, which leases the fields to a local farmer. In order to conduct any investigative or research related work on this site, TNC requires that a Research Permit Applicationbe submitted that describes the project in detail (Attachment 17). If the project meets all the rigorous requirements and constraints of TNC, they issue a research permit to conduct the work (Attachment 18).

The proposed field characterization initiative described herein is fully funded by the U.S. Dept. of Energy, Office of Health and Environmental Research, through Grant # DE-FG06-92ER61507. Golder Associates will subcontract all field support necessary to conduct this project (i.e., roto-sonic drilling and coring), and will supervise the field operations. Laboratory analyses and future research initiatives are funded through other individual research grants.

The first of the flow-cells is scheduled for installation in early October, 1998, and the second in early 1999. Flow-cell installations are expected to take one to two weeks. MLS installations will be scheduled for approximately 1 month following the installation of the flow-cells, and tracer injection experiments will take place in 1 to 2 months following MLS installation. Additional characterization work (i.e., CPTs) and excavations have not been scheduled at this time.

Those categorical exclusions that are applicable to the proposed field program, in accordance with Appendix B to Subpart D to 10 CFR Part 1021, are as follows:

B3 Categorical exclusions applicable to site characterization, monitoring, and general research.

B3.1 Site characterization/environmental monitoring.

B3.6 Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects.

B3.8 Outdoor ecological/environmental research in a small area.

III. **Potential Environmental Effects:** (Attach explanation for each "yes" response, and "no" responses if additional information is available and could be significant in the decision making process).

A. **Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?**

| | Yes/No | Attmnt |
|---|---|---|
| 1. Threatened/Endangered Species and/or Critical Habitats | __x_ | 1,2,3 |
| 2. Other Protected Species (e.g., Burros, Migratory Birds) | __x_ | _____ |
| 3. Wetlands | __x_ | _____ |
| 4. Archaeological/Historic Resources | __x_ | 4,5 |
| 5. Prime, Unique, or Important Farmland | x___ | 6 |
| 6. Non-Attainment Areas | __x_ | _____ |
| 7. Class I Air Quality Control Region | __x_ | _____ |
| 8. Special Sources of Groundwater (e.g. Sole Source Aquifer) | x___ | 7,8,9 |
| 9. Navigable Air Space | __x_ | _____ |
| 10. Coastal Zones | __x_ | 10,11 |
| 11. Areas w/Special National Designation (e.g. National Forests, Parks, Trails) | __x_ | _____ |
| 12. Floodplain | x___ | 12,13 |

B. **Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities?**

| | Yes/No | Attmnt |
|---|---|---|
| 13. Clearing or Excavation (indicate if greater than 5 acres) | __x_ | _____ |
| 14. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 10 acres) | __x_ | _____ |
| 15. Noise (in excess of regulations) | x___ | 14 |
| 16. Asbestos Removal | __x_ | _____ |
| 17. PCBs | __x_ | _____ |
| 18. Import, Manufacture or Processing of Toxic Substances | __x_ | _____ |
| 19. Chemical Storage/Use | __x_ | _____ |
| 20. Pesticide Use | __x_ | _____ |
| 21. Hazardous, Toxic, or Criteria Pollutant Air Emissions | x___ | 15 |
| 22. Liquid Effluent | __x_ | _____ |
| 23. Underground Injection | __x_ | _____ |
| 24. Hazardous Waste | __x_ | _____ |
| 25. Underground Storage Tanks | __x_ | _____ |
| 26. Radioactive (AEA) Mixed Waste | __x_ | _____ |
| 27. Radioactive Waste | __x_ | _____ |
| 28. Radiation Exposures | __x_ | _____ |

C. **Other Relevant Disclosures. Will the proposed action involve the following?**

| | | |
|---|---|---|
| 29. A threatened violation of ES&H regulations/permit requirements | __ x __ | 16,17,18 |
| 30. Siting/Construction/Major Modification of Waste Recovery or TSD Facilities | __ x __ | _____ |
| 31. Disturbance of Pre-existing Contamination | __ x __ | _____ |
| 32. New or Modified Federal/State Permits | x __ | 19,20,21,22,23 |
| 33. Public controversy (e.g. Environmental Justice Executive Order 12898 consideration and other related public issues) | __ x __ | _____ |
| 34. Action/involvement of Another Federal Agency (e.g. license, funding, approval) | __ x __ | _____ |
| 35. Action of a State Agency in a State with NEPA-type law. (Does the State Environmental Quality Review Act Apply?) | __ x __ | _____ |
| 36. Public Utilities/Services | __ x __ | _____ |
| 37. Depletion of a Non-Renewable Resource | __ x __ | _____ |

IV. **Section D Determination**: Is the project/activity appropriate for a determination by the OM under Subpart D of the DOE NEPA Regulations for compliance with NEPA?

Yes No

Indicate the recommendation and specific class of action from Appendix A-D to Subpart D (10 CFR 1021):

A. **DOE-CH NEPA Coordinator Review:**

Proposed Class of Action Recommended
CX EA EIS

Category_____

DOE-CH NEPA Coordinator Reviewer: _____

Signature: _____ Date:_____

B. **DOE CH NCO NEPA Review:**

NCO Concurrence with Proposed Class of Action Recommended
CX EA EIS

Category_____

DOE CH NCO Reviewer: _____

Signature: _____ Date: _____

**DOE Recommendation Approvals:**

CH PM: _____ Signature: _____

Date: _____

CH NCO: W. S. White _____ Signature: _____

Date: _____

CH GLD: _____ Signature: _____

Date: _____

CH STS: Michael J. Flannigan _____ Signature: _____

Date: _____

CH TAS: John P. Kennedy _____ Signature: _____

Date: _____

**Office Manager Subpart D CX Determination and Approval:**

The preceding pages are a record of documentation required under DOE Final NEPA Regulation, and 10 CFR Part 1021.400 to establish that an action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for the Categorical Exclusion referenced above. Therefore, by my signature below, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

(Proper Authority): _____ Signature: _____

Date: _____

cc: Appropriate Program Office NCO
TAS
Appropriate Area Office
CH NCO

# Environmental Assessment

# Groundwater Remediation Field Laboratory at Dover AFB

Department of the Air Force
Armstrong Laboratory Environics Directorate

October 1995

# Executive Summary

The proposed action establishes a Groundwater Remediation Field Laboratory (GRFL) at Dover Air Force Base (AFB), Delaware to demonstrate and compare in-situ detection, monitoring, and remediation technologies designed for dense non-aqueous phase liquid (DNAPL) contamination. This environmental assessment (EA) evaluates the potential impacts to the environment that may result from constructing and operating the GRFL.

DNAPL contamination poses one of the most challenging problems facing the Department of Defense (DOD) in its attempt to comply with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). DNAPL is a term used to describe a number of materials which are relatively immiscible with, and denser than, water. As a result of these properties, they migrate downward when spilled on the ground, and can migrate below the water table. Especially once below the water table, they are difficult to locate and remove. For the Air Force, the term DNAPL is virtually synonymous with chlorinated solvents, used for years as industrial cleaners and degreasers, and responsible for the dissolved phase and DNAPL contamination at approximately one third of all Air Force contaminated sites. Currently there are no acceptable, cost effective methods for removing or treating the bulk solvent material that sinks into aquifers or is trapped within the soil interstices. These technologies must be developed to protect the public from any health risks associated with DNAPLs and the associated dissolved phase which are found in the subsurface at a large number of Air Force bases as well as hundreds of other public and private contaminated waste sites.

The Air Force, through the Armstrong Laboratory Environics Directorate (AL/EQ), Tyndall AFB, Florida, proposes to develop the GRFL as part of the joint DOD/National Environmental Technology Demonstration Program [D/NETDP] which is funded through the Congressionally-established, Tri-Service Strategic Environmental Research and Development Program (SERDP). SERDP was begun in 1990 by Sen. Sam Nunn, former Sen. Al Gore and others through Public Law 101-510 (10U.S.C.2901-2904). The purpose of the program is to "harness some of the resources of the defense establishment...to confront the massive environmental problems facing our nation and the world today," (Sam Nunn: Senate Floor Speach, June 28, 1990). It is a multi-agency program funded through DoD and designed to respond to the environmental requirements of the military and those problems that the DoD shares with Department of Energy and Environmental Protection Agency. If developed, the GRFL will become one of the D/NETDP's National Test Sites for field demonstration of innovative remediation technologies.

The GRFL differs from other technology demonstration programs in its use of a mass balance design. This design allows for a known, experimental quantity of DNAPL to be emplaced in a test cell prior to a technology demonstration. The test cells are constructed of two concentric rectangles made of steel sheet piling sections. Remedial, or monitoring/detection technologies can be demonstrated side-by-side in the same soil matrix and be evaluated for their effectiveness in removing the emplaced DNAPL.

The proposed action consists of a series of construction and operations activities. Construction involves installing tests cells and monitoring wells, temporary buildings, and fencing. Operations will consist of emplacing the DNAPL, demonstrating and evaluating innovative technologies, monitoring for DNAPL containment integrity, and properly treating and disposing of wastes.

The most common DNAPLs encountered as environmental contaminants throughout the Air Force are tetrachloroethylene (PCE), trichloroethylene (TCE) and other chlorinated compounds. The compound of most concern, due to its pervasiveness and high toxicity, is TCE. For this reason, this E.A. was prepared using TCE as the DNAPL to evaluate a worst case scenario.

The worst case scenario estimates the possible environmental impacts for activities during the test cell construction and for release of 15 liters of TCE in each of five test cells. Overall, this environmental assessment indicates that emplacement of DNAPL in the subsurface would have insignificant impacts to human health and the environment even if one wall of proposed containment were eliminated, the primary containment layer were ruptured by a catastrophic event, a proposed vapor barrier were not in place, proposed monitoring were not conducted, and proposed remediation of plume and source were not carried out as planned. The following sections provide a summary of these worst case impacts, and Chapter 4 discusses them in more detail.

### Air Resources

The GRFL will not significantly impact ambient air quality (i.e., particulate or volatiles). Insignificant particulate air quality impacts could result from the movement of approximately three construction vehicles on the site for a maximum period of 6 months. This activity could result in the equivalent emission of approximately 0.142 tons of particulate matter with particle diameter less than 10 micrometers in size ($PM_{10}$). $PM_{10}$ generated by the GRFL construction would increase the annual $PM_{10}$ from Dover AFB stationary sources (11.3 tons in 1993) by less than one-tenth of 1 percent (USAF, 1994).

As part of the environmental assessment, volatization of TCE at the surface of the GRFL was calculated after a shallow release. To make this scenario as conservative as possible we artificially assumed no vapor cover on the surface, release of TCE 1 foot below the surface, and subsequent steady diffusion of TCE to the surface. The threshold limit value published by the American Conference of Governmental Industrial Hygienists for exposure to TCE in a normal 8-hour workday and 40-hour workweek is 50 ppm. Using a box model on the surface, with a less-than-average local wind speed, yields a surface air concentration of 0.047 $g/m^3$ or 8.4 parts per million (ppm) per test cell. This conservative estimate is well below the 50 ppm threshold limit. Operations at the GRFL will use a polyethylene vapor cover to control vapor emissions, so design exposures will be near zero.

### Water Resources

Three engineered barriers will be employed to contain the TCE, so the GRFL is not expected to impact groundwater resources outside of the test site under any proposed circumstances. The risk assessment was performed to estimate the most severe groundwater impacts that could result from a catastrophic breach in one containment system with no redundant containment and no remediation of plume or source. The assessment considers two hazards: vertical infiltration of TCE into the confining aquitard, and failure of the test cell joints with flow through the cell and horizonal propogation of a dissolved TCE plume in groundwater.

Two release scenarios were considered for analysing the risks of subsurface migration after release. In one, soil that has been carefully mixed, but not saturated with TCE is carefully emplaced in the soil below the water table. Under these conditions the soil holds solvent much like a sponge, so that no further migration of the liquid will occur. (See Exhibit 3-3, page 3-5).

The horizonal worst case scenario estimates the dissolved TCE concentration in the uppermost waterbearing strata one mile from the GRFL site would be no more than 0.0033mg/L. This is the of potential concentration at the nearest existing water wells, assuming catastrophic failure of two levels of containment, failure of a backup pump-and-treat system, and failure of the responsible party to excavate the source of the contamination. It also neglects the fact that the contamination would be fully captured by the St Jones river, located one half mile away. The modeled concentration is well below the MCL of 0.005mg/L for groundwater, in any event.

Similar risk analysis shows the GRFL will have no significant impacts to surface water resources. In the most extreme scenario, the peak concentration of contaminated groundwater mixing completely with the river at its lowest recorded flow rate, resulted in a peak TCE concentration of 0.001 mg/L. This is below the TCE surface water limit for Delaware, 0.016mg/L.

**Surface Resources**

Insignificant impacts to the many biological resources will result from the construction and operation of the GRFL. There are no Federally listed threatened or endangered plant or animal species on Dover AFB. Several species of plant or animal that are of State Special Concern exist on Dover AFB, but none are in or near the GRFL site. The proposed GRFL site is a frequently mowed field providing minimal existing wildlife habitat to be impacted by construction or operation of the GRFL.

Similarly, the Delaware State Historic Preservation Office has concluded that there are no cultural resources on the proposed GRFL site. See Appendix F for a copy of the letter of approval from the Delaware State Historic Preservation Office.

Best management practices will be followed during construction, including periodic watering of disturbed soils. No wetlands or floodplains will be affected during construction and operation associated with the proposed action.

**Noise Resources**

Neither the construction (normally limited to daylight hours) nor the operation of the GRFL will generate noise greater than 70 dBA (noise of a face-to-face conversation) at any sensitive receptor. Thus, noise impacts associated with the construction and the operation of the GRFL will be insignificant.

**Visual Resources**

The visual impacts to Dover AFB and community associated with the GRFL will be insignificant. The proposed GRFL construction and operation will be consistent with base appearance standards and the site chosen has a row of trees between the proposed GRFL and Highway 113.

**Socioeconomic Resources**

Money spent on construction payrolls and for purchase of construction material will generate a slight local cycle of induced commercial and industrial activity. Construction will be intermittent for approximately 6 months necessitating food and lodging for workers. The associated impacts on the hotel and restaurant industry, and the construction supply industry would be positive yet fairly minimal in extent. Similar impacts to the hotel and restaurant industries will result from the operation of the GRFL. Because of the

minimal extent of the construction and operation activities, there will be no negative impacts to the population or employment in the vicinity of Dover due to fluctuations in demand for materials or services.

**Health, Safety, and Waste Management**

Because the proposed GRFL design minimizes any adverse effects to the health and safety of workers on Dover AFB, the construction or operation of the proposed GRFL will have insignificant impacts to the health and safety of workers. Any wastes generated during operation of the GRFL will be disposed of in the same manner as required for all investigation derived wastes at Dover AFB.

Further, additional measures will be taken to minimize any potential impacts to the GRFL environs including developing a spill control and countermeasures plan (SCCP) to be consistent with and appended to the existing base-wide SCCP, a groundwater monitoring plan to be in place and approved by the Delaware Department of Natural Resources and Environmental Control (DNREC) prior to any proposed experiment. Similarly, the basic design of the GRFL minimizes the potential of adverse affects to human health and safety. It consists of engineered barriers, an inward hydraulic gradient between the outer and inner test cell, and monitoring wells which can be converted to capture (pump and treat) wells in the unlikely event of a release.

Construction and operation of the GRFL will fully comply with the occupational safety and health program in force at Dover AFB. OSHA compliance is assured under such a program.

## **II.** Representative NEPA Documentation for Oak Ridge National Laboratory

Date: March 31, 1998

o: D. R. Allen, DOE-ORO

rom: W. M. Belvin, DOE-ORO

Subject: Contract DE-AC05-96OR22464, National Environmental Policy Act (NEPA) Categorical Exclusion (CX) for *Small-Scale Research and Development Projects and Pilot Studies Conducted by ORNL Environmental Sciences Division* (2657X)

ie DOE Oak Ridge Operations Office (ORO) proposes to conduct small-scale research and development ivities that would include but not be limited to (1) outdoor ecological and other environmental research udies and (2) inventory and information collection activities, as well as small-scale pilot projects nducted to verify a concept before demonstration actions. These activities would take place inside isting laboratories in the Environmental Sciences Division at ORNL, at existing structures and facilities n the DOE Oak Ridge Reservation, and at selected geological and ecological sites.

search and development activities would include but be not limited to (1) studying the distribution and cling of natural chemicals and environmental contaminants in various ecosystems; (2) exploring and veloping methods to expand the monitoring range for contaminants; (3) exploring the use of pathogenic bacteria in the removal of contaminants from various media (water, soil, waste, etc.); studying the use of natural autotrophic biofilms in the removal of contaminants from soil, water, waste terials, etc.; (5) developing systems for measuring toxic metal in various media; (6) fabricating and ing components for various ecosystems and facilities; (7) studying the effects of man-made objects and ntaminants on the aquatic biosphere; (8) collecting field data and conducting analyses of the factors lating plant and animal ecosystems; (9) conducting research to verify a known technology; ) conducting cycling studies of nutrient-cycling pathways in various ecosystems; (11) conducting search that would lead to development of hardware and software; (12) studying the effects of altered ospheric conditions on ecosystems; (13) developing new capabilities for fabricating instrumentation evant to environmental monitoring; and (14) using theoretical and computational capabilities to model vironmental problems of industrial and scientific interest.

y wastes generated during research and development activities would be appropriately characterized and posed of at existing permitted/approved waste storage, treatment, or disposal facilities. The proposed ons would be evaluated by Pollution Prevention or other responsible personnel for action options to uce or eliminate generation of waste materials.

proposed actions that would take place on the ORR have been reviewed in accordance with the *grammatic Agreement Among the Department of Energy Oak Ridge Operations Office, the Tennessee e Historic Preservation Officer, and the Advisory Council on Historic Preservation Concerning nagement of Historical and Cultural Properties at the Oak Ridge Reservation* (PA) and found to be ressed in Section III.A.1 of the PA. Should the proposed ORR actions have an adverse effect on erties constructed before 1960 or properties included or eligible for inclusion in the National Register istoric Places, DOE-ORO would consult with the State Historic Preservation Officer and initiate ons specified in procedures set forth in the Council's regulations beginning at 36 CFR 800.5(e)–800.6.

ure that sensitive resources are protected, existing maps and surveys/studies on threatened and/or ngered species, wetlands and floodplains, and historically sensitive areas would be used to locate these

areas. In addition, personnel responsible for identifying these resources would be consulted; if warranted, additional surveys and walkovers would be conducted to confirm or update available information.

No known extraordinary circumstances would be associated with these actions, and they would not be connected to other actions with potentially significant impacts or be related to other proposed actions with cumulatively significant impacts. These actions would meet the conditions that are integral elements of the classes of actions which may be categorically excluded from further National Environmental Policy Act (NEPA) documentation. Should a specific action not meet the conditions for CX consideration, a separate NEPA document would be prepared and submitted to DOE-ORO for review and approval.

Although these actions may fall under the category of "small-scale indoor and outdoor research, development, and pilot activities," a separate NEPA review would be performed and documented should an action or related/cumulative effect of an action have the potential to result in an unusual or significant impact to the environment.

These actions would pose no threat of significant individual or cumulative environmental effects. The described actions would not be part of an ongoing Environmental Assessment or Environmental Impact Statement. No extraordinary circumstances would be related to these actions, and the proposals would not be connected to other actions with potentially significant impacts.

B3.4 and B3.6 are the applicable CXs that covers the proposed actions in DOE NEPA Implementing Procedures, 10 CFR 1021, Subpart D, Appendix B.

The above description accurately describes the proposed actions, which reflects the requirements of the CXs cited above. Therefore, I recommend that the proposed actions be categorically excluded from further NEPA review and documentation.

W. Mark Belvin
DOE-ORO Program Manager

4/3/98
Date

Based on my review and the recommendation of the DOE-ORO Program Manager, I have determined that the proposed actions are categorically excluded from further NEPA review and documentation.

David R. Allen
DOE-ORO Office NEPA Compliance Officer

4/9/98
Date

**Notification:**
W. M. Belvin, ER-11
J. A. Hall, 1061, MS-6429

Date: Wed, 20 May 1998 13:32:36 -0400
To: gub1
From: watsondb@ornl.gov (David Watson)
Subject: NEPA for Reactive Barriers (3757)
Cc: ea6@ornl.gov (Elizabeth A. Rasor), uvx@ornl.gov (Darlene Allred), hom

----- Forwarded Message
Date: Wed, 20 May 1998 12:37:44 -0400
From: ivd@ornl.gov (Iris Darling Shelton)
Subject: NEPA for Reactive Barriers (3757)
To: watsondb@ornl.gov (Dave B. Watson)
Cc: sd2@cosmail3.ctd.ornl.gov, ivd@cosmail3.ctd.ornl.gov, jen@cosmail3.ctd.ornl.gov, rj7@cosmail3.ctd.ornl.gov, e4n@cosmail3.ctd.ornl.gov, dga@cosmail3.ctd.ornl.gov, v22@cosmail3.ctd.ornl.gov, jgr@cosmail3.ctd.ornl.gov

**NEPA REVIEW REPORT**
**Y-12 File 3757**

**Project Title:** In Situ Permeable Reactive Barriers for Metals & Rad: Sampling and Dye Tracer Study

**Project Engineer/Manager:** Dave Watson

**Project/Charge No.:** 3380-5529

**Work Location:** Trench area at S-3 Pond site, Oak Ridge Y-12 Plant

**Brief Description:** This project proposes to sample wells, monitor groundwater levels, and conduct dye tracer studies in support of the technology demonstration for In Situ Permeable Reactive Barrier project.

**Comments:** Use of micropurge was noted as test technizue that produces less wastewater (from Pollution Prevention).

**References:** DOE Document CX-GEN-004, "Categorical Exclusion for Site Characterization, Investigation, and Environmental Monitoring Activities," approved October 7, 1997.

Section III.A.1 and III.D.3 of the DOE Programmatic Agreement titled, *Programmatic Agreement Among the Department of Energy Oak Ridge Operations Office, the Tennessee State Historic Preservation Officer, and the Advisory Council on Historic Preservation Concerning Management of Historical and Cultural Properties at the Oak Ridge Reservation,* approved May 6, 1994.

In accordance with the above references the described work is approved. No further NEPA documentation is required, and Section 106 requirements of the National Historic Preservation Act have been satisfied. Please retain a copy of this report in the project files. A field review or surveillance of this action may be conducted in the future to verify that activities comply with the project description.

Questions or comments should refer to **NEPA File # 3757.**

I. D. Shelton, NEPA Coordinator (574-2936)
J. L. Webb, NHPA Coordinator (576-5715)
Environmental Compliance, Y-12 Plant
Lockheed Martin Energy Systems, Inc.

# CATEGORICAL EXCLUSION (CX) FOR SITE CHARACTERIZATION, INVESTIGATION, AND ENVIRONMENTAL MONITORING ACTIVITIES CX-GEN-004

The DOE Oak Ridge Operations Office (ORO) proposes to conduct site characterization and monitoring, air and stack effluent monitoring, plant and animal sampling, surface water sampling, and actions that would include but not be limited to geological, geophysical, geochemical, engineering surveys, and mapping. Also, the proposed actions would be used to assess the soil and subsurface conditions in proposed construction projects, monitor and characterize groundwater flow, obtain data on aquifers, assess active and inactive waste management areas, and assess subsurface contaminated facilities that are potential sources of release to the environment.

The proposed actions would take place at DOE-owned facilities on the DOE Oak Ridge Reservation (ORR) at Oak Ridge, Tennessee; the Portsmouth Gaseous Diffusion Plant near Piketon, Ohio; the Paducah Gaseous Diffusion Plant near Paducah, Kentucky; the Weldon Spring Remedial Action Project near Weldon Spring, Missouri; and the Thomas Jefferson National Accelerator Facility at Newport News, Virginia. In addition, these actions might take place at other DOE-ORO–operated facilities (e.g., Formerly Utilized Site Remedial Action Program sites) and ancillary areas associated with these sites, programs, and projects.

As required by agreements among DOE, the Environmental Protection Agency, and the affected states, a variety of characterization actions would be performed to determine the presence or nature and extent of environmental contamination at the referenced locations. Characterization under these agreements would be done in accordance with applicable regulatory drivers, such as the Resource Conservation Recovery Act (RCRA), the Atomic Energy Act, and/or state laws. These laws require monitoring and investigation of all environmental media that might have been affected by waste that was either treated, stored, or disposed of at the sites.

A variety of investigation/characterization actions would be performed to obtain geological, geophysical, and geochemical data and to determine the presence or nature and extent of environmental contamination. Actions would include collection and analysis of samples and interpretation of the data. Samples would be analyzed for site-specific parameters including (but not limited to) pH, conductivity, dissolved oxygen, metals, mercury, lead, volatile organics, semivolatile organics, polychlorinated biphenyls, asbestos, uranium, and various other radiological analyses of concern. Specific actions might include (but would not be limited to) the following:

1. Drilling of boreholes to obtain subsurface core samples. Core materials might be characterized in the field, archived for later analysis, or sampled for contamination.

2. Collection and analysis of surface soil samples.

3. Installation and development of long-term or short-term groundwater monitoring wells. Groundwater wells and temporary piezometers would be installed to monitor and characterize groundwater flow. Well installation would include soil and bedrock coring and sampling, well drilling, construction, and development of groundwater investigation and monitoring of wells (including vadose zone wells and installation). Construction and development would include (1) emplacement of well casings, screens, and annular seals and (2) construction of the concrete pad of the well, protective posts, and access road, if needed. Groundwater monitoring wells would be constructed in accordance with RCRA-quality requirements and would include seals to prevent

infiltration of surface water and mixing of groundwater. Temporary piezometers (simple well screens without filter packs and seals) could be used for some characterization. Piezometers would be used only in shallow formations where mixing of groundwater due to penetration of the borehole would be of no concern. Wells and piezometers would be periodically purged and sampled for groundwater contamination. Aquifer testing would be conducted at some wells.

4. Well plugging and abandonment (including inspection and sampling of wells to verify location, method of construction, and current conditions) and purging water, as required. Well plugging and abandonment would take place using a variety of methods such as casing removal, overdrilling, grout filling, etc. Minor excavation around wellheads might be required prior to commencement of plugging and abandonment actions.

5. Well plugging and abandonment that would include (1) decommissioning groundwater investigation or monitoring wells that have been damaged or destroyed or (2) wells that are a hindrance to construction activities or environmental restoration projects.

6. Installation of water-level monitoring equipment at wells and surface water stations. The latter might require construction of flumes/gaging stations within stream channels.

7. Surface and groundwater sampling and analysis. Some surface water sampling sites would require installation of temporary, removable devices for measurement of surface water flow rates. Actions would include dye tracer studies.

8. Aquifer testing that would include slug, hydraulic packer, and pump testing to characterize hydraulic properties of aquifers. This would include installation of water-level recording devices into characterization, monitoring, and/or piezometric wells to determine vertical and horizontal groundwater flow directions.

9. Installation/relocation of Surface Water Hydrological Information Support Systems houses to surface water monitoring locations.

10. Geophysical exploration including electromagnetic profiling, seismic reflection/refraction, wireline geophysics, and ground penetrating radar.

11. Installation of shallow (< 1-foot–deep) soil gas monitors or insertion of soil gas withdrawal tubes.

12. Installation of rain gauges, evaporative pans, anemometers, or other meteorological monitoring equipment.

13. Construction and use of air monitoring stations to determine ambient air quality or potential air quality impacts during assessment actions.

14. Routine decontamination of equipment.

15. Sampling of solid waste streams including soil cuttings, personal protective equipment, and process equipment and process waste streams.

16. Sampling of nonendangered plant and animal species.

17. Sampling of stack effluent emissions.

18. Establishment of staging areas for purposes of conducting characterization work. Staging areas would be used for material and equipment laydown and as temporary satellite accumulation areas for wastes (in drums, tanks, or other containers) generated by characterization actions (e.g., drill cuttings and decontamination wastes). Staging areas would be operated and maintained in compliance with site waste management procedures for the duration of their operation and during setup of decontamination trailers/change houses. Staging areas would be established in previously disturbed areas (or in areas that would require minimal grading) and would be covered with gravel or gravel and geotextile material. Temporary access roadways (or temporary extensions of existing roadways) might also be constructed, as necessary. Clearing of low brush or removal of trees and shrubs with the goal of minimization of clearing might also occur.

19. Installation and operation of field instruments, such as flow-measuring devices.

20. Maintenance and modification of existing wells and structures (i.e., painting, minor surface grading/sloping, cleaning, tagging, etc.).

The proposed action would be evaluated by Pollution Prevention personnel for action options to reduce or eliminate generation of waste materials. Environmental samples would be analyzed in on-site or off-site laboratories. The analysis procedures often consume the sample. Should the sample not be consumed, the remaining sample would be acceptable for disposal in existing permitted/approved facilities in accordance with laboratory operating procedures. Any wastes generated would be acceptable for disposal in existing permitted/approved or exempt facilities.

The proposed actions that would take place on the ORR have been reviewed in accordance with the *Programmatic Agreement Among the Department of Energy Oak Ridge Operations Office, the Tennessee State Historic Preservation Officer, and the Advisory Council on Historic Preservation Concerning Management of Historical and Cultural Properties at the Oak Ridge Reservation* (PA) and found to be addressed in the PA under Section IV, Item R, Environmental Monitoring. If the proposed ORR actions would have an adverse effect on properties constructed before 1960 or properties included or eligible for inclusion in the National Register of Historic Places, DOE-ORO would consult with the State Historic Preservation Officer (SHPO) and initiate actions specified in procedures set forth in the Council's regulations beginning at 36 CFR Part 800.5(e)–800.6.

For sites other than the ORR, DOE-ORO would complete Section 106 reviews consistent with the ORR PA, as discussed above, until PAs are ratified for the respective sites. At such time, the sites would conduct Section 106 reviews under provisions of the site-specific PA.

## CATEGORICAL EXCLUSION (CX) FOR SITE CHARACTERIZATION, INVESTIGATION, AND ENVIRONMENTAL MONITORING ACTIVITIES
### CX-GEN-004

Should the proposed site characterization, investigation, and environmental monitoring actions involve ground disturbances at locations where an archeological survey had not been conducted or take place at previously disturbed locations where the potential exists to exceed the depth of previous ground disturbances, DOE-ORO would consult with the SHPO to determine whether an archeological survey would be warranted prior to initiating the proposed actions.

To ensure that sensitive resources are protected, existing maps, surveys and studies on threatened and/or endangered (T/E) species, wetlands and floodplains, and historically sensitive areas would be used to locate these areas. In addition, personnel responsible for identifying these resources would be consulted and, if warranted, additional surveys and walkovers would be conducted to confirm or update available information.

No known extraordinary circumstances would be associated with these actions that might affect the significance of the environmental effects of the proposed action based on past similar actions. These actions would not be connected to other actions with potentially significant impacts or related to other proposed actions with cumulatively significant impacts; they would meet the conditions that are integral elements of the classes of actions which may be categorically excluded from further National Environmental Policy Act (NEPA) documentation. Should the action not meet the conditions for CX consideration, a separate NEPA document would be prepared and submitted to DOE-ORO for review and approval.

Although an action might fall under the category of "site characterization, investigation, and environmental monitoring," a separate NEPA review would be performed and documented should the action or relocation/ cumulative effect of the action have the potential to result in an unusual or significant impact to the environment.

B3.1 is the applicable CX that covers the proposed action in DOE NEPA Implementing Procedures, 10 CFR 1021, Subpart D, Appendix B.

Based on my review of the above description, I have determined that the above actions are categorically excluded from further NEPA review and documentation. The DOE Contracting Officer Representative is responsible for oversight of the application of this determination.

David R. Allen
Oak Ridge Operations Office (ORO) Acting NEPA Compliance Officer

10-2-97
Date

# Tracer Test Workplan - Pathway 2
# S-3 Ponds, Permeable Reactive Barrier Trench Project

## 1.0 Introduction

The purpose of this workplan is to describe the objectives and procedures for conducting a tracer injection test at the S-3 Ponds, pathway 2, permeable reactive barriers trench site located at the Y-12 Plant. A 225 foot long trench has been excavated at pathway 2 and backfilled with gravel and iron filings. The zero valent iron was installed in a 26 foot long section in the middle of the trench (Figure 1). The trench was constructed to demonstrate the hydraulic capture and treatment of uranium, nitrate, and technetium in a permeable reactive trench configuration. The trench was designed so that contaminated groundwater is collected on the upgradient end of the trench, treated as it passes through the iron filings, and discharges on the downgradient end of the trench. Under certain hydraulic conditions contaminated groundwater may migrate across the trench instead of down the trench. A bromide tracer will be injected in TMW-11 and rhodamine WT dye tracer will be injected in DP-13 to assess flow paths and transport rates through the iron.

## 2.0 Objectives

The primary objectives of the tracer testing include the following:

1) Determine the groundwater velocity, treatment volume, and groundwater residence time in the iron.

2) Determine the predominant flow paths through the iron. Tracers will be injected in 2 locations to determine if the predominant groundwater flow direction through the iron is parallel to the trench or across the trench.

## 3.0 Scope

Bromide and a flourescent dye tracer will be injected simultaneously in wells TMW-11 and DP-13, respectively. TMW-11 is located in the gravel portion of the trench just upgradient and east of the iron. DP-13 is located upgradient but north of the iron and out of the trench. Sixteen piezometers and 4 seeps (seeps 1, 2, 3, and 4) suspected to be in the flow path of the iron will be monitored approximately 12 times over a 1 to 2 week period for break through of the tracers. Samples will be collected at a frequency of approximately 2 times a day for the first 2 days to determine the approximate rate of tracer movement. The subsequent monitoring schedule will be adjusted if the tracer is migrating faster or slower than anticipated. Up to 42 piezometers and 4 seeps will be monitored twice during the tracer test to obtain a snap shot of tracer distribution. One snap shot will be conducted after initial breakthrough has occurred at the seeps and a second snap shot sampling round will be conducted several days later. The target date for injection is the week of May 18th. If possible one of the snap shot sampling

rounds will take place at the same time as the analytical sampling round planned for the first week of June.

The 16 piezometers that will be monitored on a more frequent basis include:

*Routine Sampling Locations* - TMW-06, TMW-07, TMW-09, TMW-11, DP-07, DP-08, DP-09, DP-10, DP-11, DP-13, DP-14D, DP-15D, DP-16D, DP-17D, DP-22D, and DP-23D

Additional piezometers besides the ones listed above that will be sampled as part of the 2 snap shot sampling rounds include the following piezometers:

*Snap Shot Sampling Locations* - DP-14S, DP-15S, DP-16S, DP-17S, DP-18S, I and D, DP-19S, I and D, DP-20S, I and D, DP-21S, I and D, DP-22S and I, DP-23S and I, EW-01, GW-836, TMW-07, TMW-12, TMW-13, TMW-14, TPB-07, and TPB-08

Tasks that will be completed as part of the tracer testing include the following.

Task 1: *Workplan Preparation* - The workplan, NEPA documentation, voluntary TDEC Dye Trace Registration form will be completed prior to tracer injection.

Task 2: *Conduct Background Screen* - At least 1 set of background samples will be collected from the 16 piezometers and 4 seeps listed above. This information will be used to determine background concentrations of bromide and potential dye tracers and finalize the tracer selection and injection concentration. The background samples will be collected during the May 11$^{th}$ analytical sampling round.

Task 3: *Finalize Tracer Selection and Equipment Preparation* - Based on the results of task 2 the selection of tracers will be finalized and any equipment modifications made.

Task 4: *Conduct Tracer Test* - The tracers will be injected the week of May 18th.

Task 5: *Sampling and Analysis* - Sampling and analytical methods that will be used to analyze for individual tracers are discussed in greater detail below. At least 1 in 15 of all samples will have duplicate analyses performed to ensure repeatability. A blank sample will be included in each sampling round.

Task 6: *Data Management* - Analytical results and field notes will be recorded in project logbooks and digital data will be kept on diskettes. Information described in the field notebooks will include project name, date and time, weather conditions, sample location, sample identification number, sample type, if a duplicate or blank sample was collected, and special conditions or changes in procedures.

## 4.0 Injection Setup and Tracer Concentrations

Carboys containing the concentrated tracers mixed with distilled water will be used as the reservoir for the injection of the tracers. A peristaltic pump will be used to inject the slug of tracer into the well. A plunger will be used to mix the tracer in the piezometer during injection. Approximately, 10 gallons (37 liters) of bromide tracer will be created by the addition of 135.2 g $MgBr_2$ $6H_2O$ to bring the bromide concentration to 2,000 ppm. Ten gallons is approximately equal to one saturated pore volume in the bromide injection well TMW-11. Approximately, 200 g of a fluorescent dye will be added to 5 gallons (20 liters) of water to produce a concentration of 10,000 ppm dye tracer. Five gallons is equal to approximately 2 pore volumes of the saturated water column in the dye injection piezometer DP-13.

## 5.0 Field and Analytical Methods

### 5.1 Bromide Analysis

Bromide is a nonreactive, anionic tracer that is present in natural groundwater at low to undetectable concentrations. It is available as a monovalent or divalent simple salt, and is a commonly used groundwater tracer because of its nonhazardous characteristics and the ease of analysis. Two analytical methods are available for this project: ion-specific probe, and ion chromatography (IC). The ion-specific probe measures a concentration based on electrical conductivity of the solution relative to a reference electrode. The advantages of the probe method are that analytical setup is compact and can be taken to the field for instantaneous measurement, it requires only 5 ml of sample, and the sample is not consumed by the analysis and is, therefore, available for other analyses. The disadvantages are that the detection limit is higher (~ 3-5 ppm) and the accuracy of the measurements is lower than IC.

The second method, ion chromatography (IC), uses chromatographic separation and conductivity to measure concentration compared to a standardized curve. The instrument is highly sensitive, particularly when anion auto-suppression is added, allowing detection at ppb levels. Approximately 20 ml of filtered sample is required and is consumed in the analysis, so that replicate analysis of the same aliquot is not possible. The analyses must be performed in the laboratory and takes somewhat longer than the probe analysis, but numerous samples can be analyzed automatically using an autosampler, thus minimizing technician time.
Because we are interested in capturing the earliest possible arrival, the IC analytical method will be used. If conditions warrant, however, IC measurements may be augmented with probe measurements conducted in the field. Analyses will be conducted in ESD laboratories using a Dionex DX-120 ion chromatograph equipped with a conductivity detector and auto-suppression. The system is computerized for automatic data analysis and digital data recording.

### 5.5 Fluorescent Dye (rhodamine WT, fluorescein, or acid red #92) Analysis

The dyes under consideration for injection at the S-3 Ponds trench site are commonly used as groundwater tracers and give no indication of significant toxicity in the concentrations used

during tracer studies. The final selection criteria for which dye to use will depend on background levels detected in the pre-test screening. The fluorescent dyes can be detected using a spectrofluorophotometer with synchronous scanning. A good description of dye tracing procedures is provided in the Workplan for the K-25 site groundwater tracer test at the K-1070-A Burial Ground for the K-901 Operable Unit.

Dye concentration can be assessed through grab sample analysis or recovered on activated coconut charcoal and unbleached cotton dye receptors commonly referred to as "bugs". Only grab samples will be collected for this project. Approximately 200 g of dye will be used in the the tracer test.

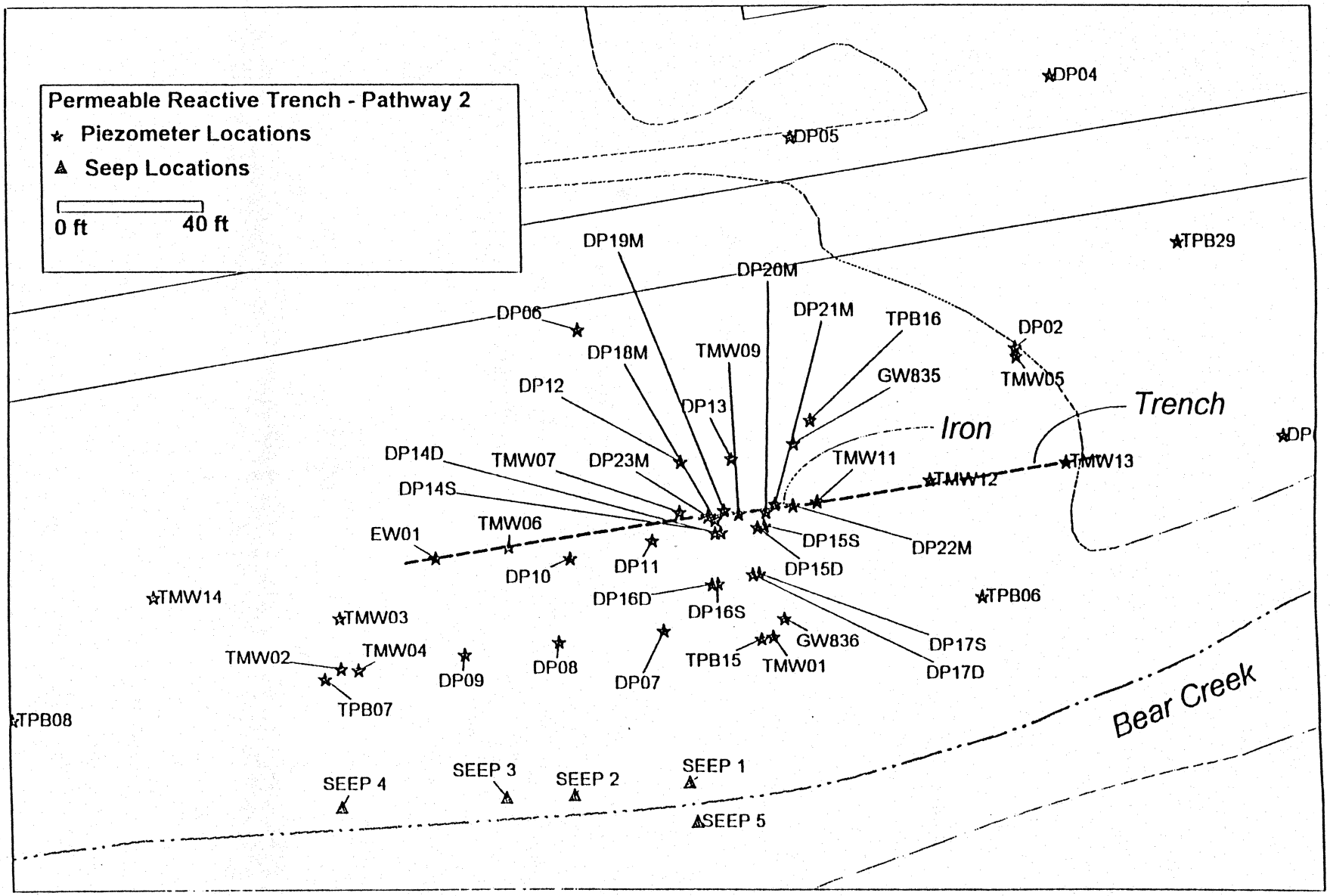
### 5.3 Sampling Methods

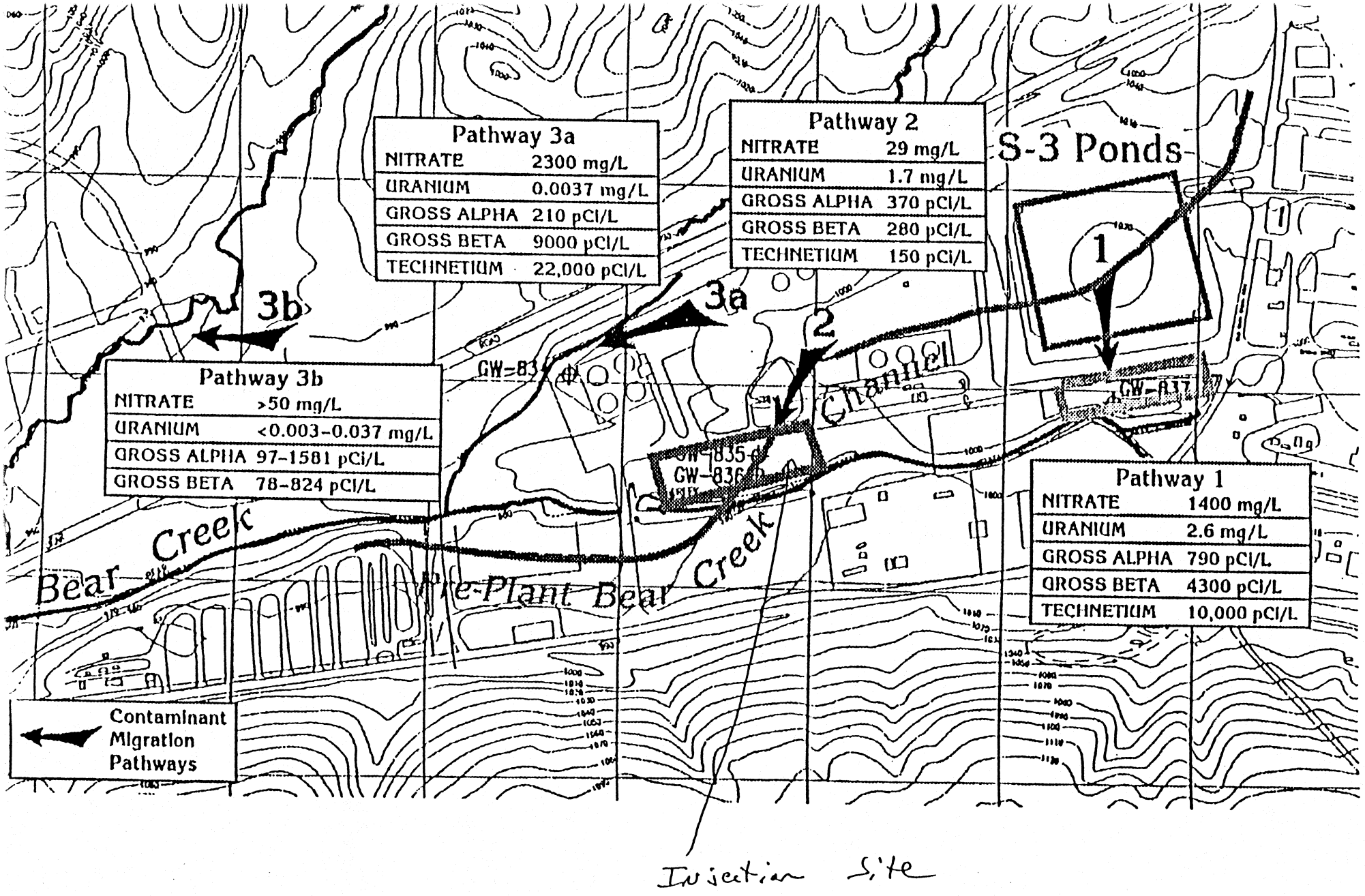
Background samples will be collected and analyzed for bromide and dye tracers prior to the start of the injections. Initially, sampling will be conducted twice a day, however, sampling frequency will be adjusted throughout the tests, depending on analytical results. Once breakthrough has occurred, the sampling frequency can be reduced to capture the main characteristics of the breakthrough curves. Samples can be prepared and stored in a refrigerator until several sampling rounds have been accumulated in order to minimize analytical time. Samples from the piezometers will be collected by pumping with a peristaltic pump. Samples will be filtered with an in-line 40 micron filter prior to collection in 80 ml glass containers. Seep samples will be collected by dipping a glass or stainless steel dipper into the seep, filtering a portion of the sample and collecting the filtered sample in the 80 ml glass containers.

### 5.4 Quality Control

At least 1 in 15 of all samples will have duplicate analyses performed to ensure repeatability. A blank sample will be included in each sample shipment. In addition, calibration curves will be constructed for each tracer and sample standards will be analyzed periodically during each set of analyses. Sampling teams will protect against the generation of contaminated samples by:

- donning new latex gloves before the start of sample collection at each site;
- working downstream of surface water sample collection points;
- collecting seep samples in order from downstream to upstream;
- refrigerating samples at a temperature of 4 degrees C if stored prior to analysis in the laboratory.


Permeable Reactive Trench - Pathway 2
Piezometer Locations
Seep Locations
0 ft
40 ft
DP04
DP05
TPB29
DP19M
DP20M
DP06
DP21M
TPB16
DP02
DP18M
TMW09
TMW05
GW835
DP12
DP13
Trench
Iron
DP14D
TMW07
DP23M
TMW11
TMW13
DP14S
TMW12
EW01
TMW06
DP15S
DP22M
DP10
DP11
DP15D
TMW14
DP16D
DP16S
TPB06
TMW03
GW836
DP17S
TMW02
TMW04
TPB15
TMW01
DP09
DP08
DP07
DP17D
TPB07
TPB08
Bear Creek
SEEP 4
SEEP 3
SEEP 2
SEEP 1
SEEP 5


Pathway 3a
NITRATE 2300 mg/L
URANIUM 0.0037 mg/L
GROSS ALPHA 210 pCi/L
GROSS BETA 9000 pCi/L
TECHNETIUM 22,000 pCi/L
Pathway 2
NITRATE 29 mg/L
URANIUM 1.7 mg/L
GROSS ALPHA 370 pCi/L
GROSS BETA 280 pCi/L
TECHNETIUM 150 pCi/L
S-3 Ponds
1
3b
3a
2
Pathway 3b
NITRATE >50 mg/L
URANIUM <0.003-0.037 mg/L
GROSS ALPHA 97-1581 pCi/L
GROSS BETA 78-824 pCi/L
GW-83
Channel
GW-835
GW-836
GW-837
Bear Creek
Pre-Plant Bear Creek
Pathway 1
NITRATE 1400 mg/L
URANIUM 2.6 mg/L
GROSS ALPHA 790 pCi/L
GROSS BETA 4300 pCi/L
TECHNETIUM 10,000 pCi/L
Contaminant Migration Pathways
Injection Site

Date: Thu, 18 Sep 1997 16:47:15 -0500
From: ivd@ornl.gov (Iris Darling Shelton)
Subject: NEPA for Tracer Tests (3705)
To: watsondb@ornl.gov (Dave B. Watson)
Cc: sd2@cosmail3.ctd.ornl.gov, ivd@cosmail3.ctd.ornl.gov,
jen@cosmail3.ctd.ornl.gov, rj7@cosmail3.ctd.ornl.gov,
e4n@cosmail3.ctd.ornl.gov, dga@cosmail3.ctd.ornl.gov,
v22@cosmail3.ctd.ornl.gov, jgr@cosmail3.ctd.ornl.gov

Y-12 Plant: Multiple Tracer Injection Test (3705)

The project to inject tracer materials into two wells in Bear Creek Valley has been reviewed in accordance with the National Environmental Policy Act (NEPA) and will require no further NEPA review or documentation, provided that the project scope remains as outlined on the Environmental Checklist. The project is preliminary to a CERCLA action and has been covered by an existing, approved general Categorical Exclusion (CX) for RI/FS/FI Activities, which has received a determination by the Manager of the DOE Oak Ridge Operations Office. Verification of NEPA approval is on file in the NEPA Program Office, Building 9115.

This activity has also been reviewed in accordance with Section 106 of the National Historic Preservation Act (NHPA) and is covered by a Programmatic Exclusion (PX) under Section III.A.1 of the Programmatic Agreement between the DOE-ORO office, the Tennessee State Historic Preservation Officer, and the Advisory Council on Historic Preservation concerning management of historical and cultural properties at the Oak Ridge Reservation. As such, the project may proceed without additional Section 106 documentation. Verification of NHPA approval is also on file in the NEPA Program Office, Building 9115.

Comments from ECO: Project personnel should take precautions not to spill the chemicals on the ground where it might migrate to surfact flow channels.

NOTE: Place a copy of this message in your project files along with a copy of the Environmental Checklist submitted for this action. This serves as verification that the activity, as documented on the Environmental Checklist, has received a NEPA and NHPA review.

The Y-12 NEPA Approval ID number should be used on the ESO as further indication of the NEPA/NHPA review and approval.

| Project ID | Contact | Activity Title | NEPA # |
|---|---|---|---|
| PK287U01 | D B Watson | Y-12 Plant Multiple Tracer Injection Test | 3705 |

Iris D. Shelton
LMES NEPA Coordinator
574-2936

Jennifer L. Webb
LMES NHPA Coordinator
576-5715

# Appendix F

# Y-12 Plant Multiple Tracer Injection Test Work Plan
# Oak Ridge Y-12 Plant, Oak Ridge, Tennessee

## 1. Introduction

The purpose of this workplan is to describe the objectives and procedures for conducting multiple tracer injection tests at two locations at the Y-12 Plant. The first tracer injection site (Fig. 1) is located in the Bear Creek Valley (BCV) Watershed picket B exit pathway wells located upgradient of spring SS-4. Wells in picket B (e.g., GW-694 and GW-706) provide monitoring of nitrate, uranium, and other contaminants migrating to the west in the Maynardville Limestone at depths of ~200 ft. The concentration of contaminants detected in the picket B wells and spring SS-4 are similar, suggesting a hydraulic connection. Sources of these contaminants include the S-3 ponds and the Bone Yard/Burn Yard (BY/BY).

The second tracer injection site (Fig. 2) is located near the Y-12 Plant eastern property boundary in the Upper East Fork Poplar Creek (UEFPC) Watershed picket J exit pathway well GW-722 (port 20). GW-722 is a multiport Westbay well that monitors the carbon tetrachloride (CT) plume that has migrated off site to the east of Y-12. The highest concentration of CT is detected in monitoring ports located between the depths of 300 and 500 ft. This is probably the interval that the CT is migrating off site in the Maynardville Limestone. The source of the CT contamination is probably DNAPL that has migrated to depth in the Maynardville Limestone upgradient of the former New Hope Pond (NHP). The installation of an underdrain beneath the UEFPC concrete-lined channel east of NHP has impacted the transport of CT by lowering groundwater levels in the shallow interval and drawing CT contamination into the underdrain. Concentrations of CT in shallow wells adjacent to the underdrain have risen from nondetected prior to its installation in 1987 to a detection of ~600 to 700 ppb during more recent sampling events. However, the degree to which the underdrain has impacted the deep off-site transport pathway is not known.

The rate of migration and impact of matrix diffusion and sorption on the fate and transport of contaminants is not well understood at either site. Therefore, when remedial actions are taken it is not known how fast the aquifer will remediate, and the frequency of monitoring needed to evaluate aquifer restoration is difficult to estimate.

## 2. Objectives

Primary objectives and benefits of the tracer testing include the following:

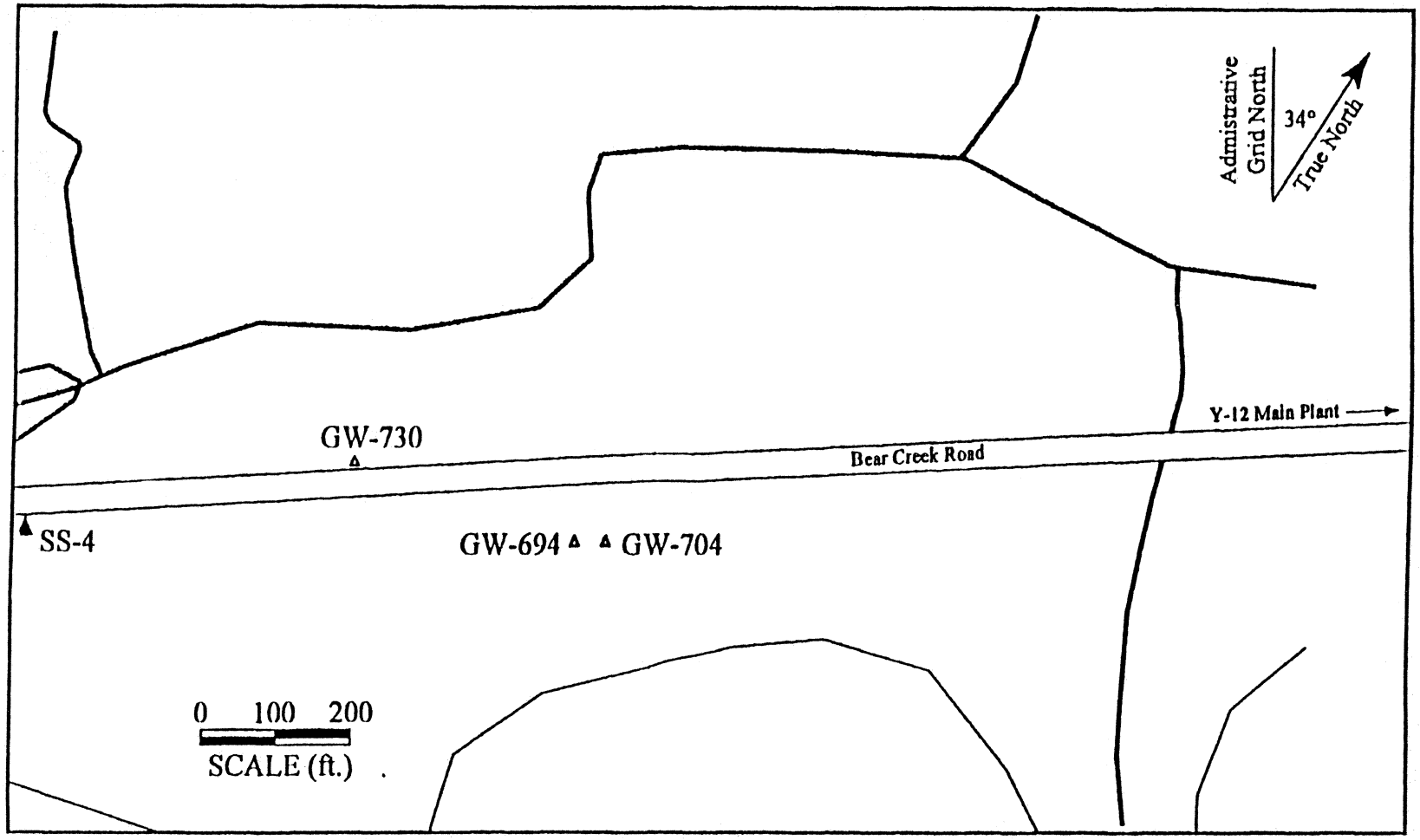



Figure 1. BCV test location map. GW-704 is the source well. GW-694 and spring SS-4 are observation sites.

## III. Representative NEPA Documentation for the Hanford Site, Richland, Washington

# CATEGORICAL EXCLUSION FOR SITE CHARACTERIZATION AND ENVIRONMENTAL MONITORING, HANFORD SITE, RICHLAND, WASHINGTON

**Proposed Action:** The U.S. Department of Energy (DOE), Richland Operations Office (RL) proposes to perform site characterization and environmental monitoring activities.

**Location of Action:** On and off the Hanford Site, Richland, Washington

**Description of Proposed Action:** The proposed action consists of both intrusive and non-intrusive site characterization and environmental monitoring activities on and off the Hanford Site. Intrusive activities include the installation and monitoring of groundwater and vadose zone wells, groundwater tracer tests, and the excavation and sampling of test pits on the Hanford Site. Non-intrusive activities consist primarily of site surveying techniques and collection of environmental media.

Groundwater and vadose zone wells and test pits would be installed as needed, in and near Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) facilities, operable units, and waste management facilities, in compliance with DOE Order 5480.4, Federal Regulations (e.g., Title 40 Code of Federal Regulations [CFR] 264 and 265, Subpart F) and Washington Administrative Code (WAC) 173-160. The monitoring wells and test pits would detect contaminant releases to the groundwater and vadose zone, facilitate the remediation and closure phases of each site, and ensure that remediation is effective.

The proposed activities include well drilling, test pit excavation, construction, development, subsequent sampling and analysis, and final closure. Drilling, constructing, and monitoring would be performed in accordance with approved and appropriate procedures. Drilling methods would primarily be standard cable tool, auger, cone penetrometer, sonic drilling, or rotary drilling technologies. When the wells are determined to be no longer necessary, wells would be abandoned in accordance with WAC 173-160.

Wells and test pits would not be sited on environmentally sensitive areas, such as: 100-year floodplains, jurisdictional wetlands (based in part on the National Wetlands Inventory compiled by the U.S. Department of the Interior), special sources of water, archaeological sites, critical habitats, property listed or eligible for listing on the National Register of Historic Places, or areas having a special environmental designation such as wild and scenic rivers, wildlife refuges, or national natural landmarks without additional National Environmental Policy Act (NEPA) documentation.

Site characterization and environmental monitoring activities that are either non-intrusive or would involve minimal small-scale intrusion would also be included in this action. These activities would include general geophysical, radiological and chemical, meteorological, cultural and biological surveys, sampling, transport of samples, and analytical techniques, including the following:

- Geophysical techniques would include, but not be limited to, methods such as electro-magnetic surveys, site surveying and mapping, soil sampling,

ground penetrating radar surveys, seismic monitoring, telemetry, and borehole spectral gamma logging techniques.

- Radiological and chemical techniques would include, but not be limited to, methods such as gamma scintillation, thermo-luminescent dosimetry, groundwater tracer studies, soil gas surveys, x-ray fluorescence, radiological surveys, and sampling, transport, and laboratory analysis of environmental samples from existing well and borehole networks.

- Meteorological data gathering techniques would include, but not be limited to, air emissions monitoring, installation of weather stations, and other climatological monitoring.

- Site characterization for archaeological and historical resources would be in compliance with 36 CFR part 800, Protection of Historic and Cultural Properties and 43 CFR part 7, Protection of Archaeological Resources or any programmatic agreement. This would include activities such as facility inspections, ground surveys, inventory of archaeological resources, exploratory test pits and trenches, core and auger tests.

- Biological characterization and environmental monitoring would include, but not be limited to, activities such as field surveys and biotic sampling (agricultural products, flora, and fauna). Wildlife and other biotic sampling would be conducted under applicable state and federal permits. Environmental monitoring would include river stage monitoring, transects, flow measurements, surface water and sediment sampling.

All contaminated materials (e.g., drill rig, equipment and tools, drill cuttings, personal protective equipment, decontamination fluids) would be dispositioned in a manner consistent with applicable regulations. Contaminated materials from well drilling activity either would be stored within a designated onsite storage area until cleanup of the operable unit, or removed from the well site and disposed or decontaminated in accordance with regulatory requirements. Final disposal of waste would likely be in the Hanford Site Central Waste Complex or other appropriate disposal unit. The activities addressed in this CX would not occur on other DOE Complex sites without obtaining appropriate NEPA documentation from the applicable DOE Field Office.

Categorical Exclusion to be Applied:

The following Categorical Exclusion (CX) is listed in 10 CFR 1021, "National Environmental Policy Act Implementing Procedures," Subpart D, Appendix B, published in the Tuesday, July 9, 1996, 61 *Federal Register* 36222:

B3.1 "Onsite and offsite site characterization and environmental monitoring, including siting, construction (or modification), operation, and dismantlement or closing (abandonment) of characterization and monitoring devices and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis. Activities covered include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. Specific activities include, but are not limited to:

(a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, and radar), geochemical, and engineering surveys and mapping, including the establishment of survey marks;
(b) Installation and operation of field instruments, such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools;
(c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells;
(d) Aquifer response testing;
(e) Installation and operation of ambient air monitoring equipment;
(f) Sampling and characterization of water, soil, rock, or contaminants;
(g) Sampling and characterization of water effluents, air emissions, or solid waste streams;
(h) Installation and operation of meteorological towers and associated activities, including assessment of potential wind energy resources;
(i) Sampling of flora or fauna; and
(j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7."

ELIGIBILITY CRITERIA

Since there are no extraordinary circumstances that may affect the significance of the environmental effects of the proposal, the proposed activity meets the eligibility criteria of 10 CFR 1021.410(b), as shown in the following table. The proposed activity is not "connected" to other actions with potentially significant impacts (40 CFR 1508.25[a][1]), or with cumulatively significant impacts (40 CFR 1508.25[a][2]), and is not precluded by 10 CFR 1021.211.

The "Integral Elements" of 10 CFR 1021 are satisfied as discussed below:

| INTEGRAL ELEMENTS 10 CFR 1021, SUBPART D, APPENDIX B | |
|---|---|
| Would the Proposed Action: | Comment or explanation: |
| Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including requirements of DOE and/or Executive Orders? | No applicable laws, regulations, or orders would be violated by the proposed actions. |
| Require siting and construction or major expansion of waste storage, disposal, recovery or treatment facilities (including incinerators)? The proposal may include categorically excluded waste storage, disposal, recovery or treatment actions. | No, the proposed action would not require the siting construction or major expansion of waste storage, disposal, recovery or treatment facilities. |
| Disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases? | No preexisting hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products would be disturbed in a manner that would result in an uncontrolled or unpermitted release. |
| Adversely affect environmentally sensitive resources including but not limited to:<br>(i) Property (e.g., sites, buildings, structures, objects) of historic, archeological, or architectural significance designated by Federal, state, or local governments or property eligible for listing on the National Register of Historic Places<br>(ii) Federally-listed threatened or endangered species or their habitat (including critical habitat), Federally-proposed or candidate species or their habitat or state-listed endangered or threatened species or their habitat<br>(iii) Wetlands regulated under the Clean Water Act (33 U.S.C. 1344) and floodplains<br>(iv) Federally- and state-designated wilderness areas, national parks, national natural landmarks, wild and scenic rivers, state and Federal wildlife refuges, and marine sanctuaries<br>(v) Prime agricultural lands<br>(vi) Special sources of water (such as sole-source aquifers, wellhead protection areas, and other water sources that are vital in a region)<br>(vii) Tundra, coral reefs, or rainforests? | No environmentally sensitive resources will be adversely affected. When appropriate, a sensitive resources review would be performed (e.g. cultural, archeological, and biological) to ensure that sensitive resources are not adversely affected. |

Compliance Action: I have determined that the proposed action meets the requirements for the CX referenced above. Therefore, using the authority delegated to me by DOE Order 451.1, I have reviewed the documentation and have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature/Date: Paul F. X. Dunigan, Jr. 4/17/97
Paul F. X. Dunigan, Jr.
RL NEPA Compliance Officer

Attachments:
Checklist Summarizing Environmental Impacts

Distribution w/attach:
B. D. Dixon, DYN
S. Herres, SID
D. W. Lloyd, EAP
L. A. Mihalik, CHI
R. C. Phillips, PNNL
F. A. Ruck, FDH
K. M. Thompson, RP
A. G. Weiner, RUST

## Checklist to Attachment 1

The following checklist summarizes environmental impacts that were considered:

### IMPACT TO AIR

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 1 | Result in more than minor and temporary gaseous discharges to the environment? | | X |
| 2 | Release other than nominal and temporary particulates or drops to the atmosphere? | | X |
| 3 | Result in more than minor thermal discharges? | | X |
| 4 | Increase offsite radiation dose to >0.1 mrem (40 CFR 61 Subpart H)? | | X |

### IMPACT TO WATER

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 5 | Discharge any liquids to the environment? | X | |
| 6 | Discharge heat to surface or subsurface water? | | X |
| 7 | Release soluble solids to natural waters? | | X |
| 8 | Provide interconnection between aquifers? | X | |
| 9 | Require installation of wells? | X | |
| 10 | Require a Spill Prevention Control and Countermeasures Plan? (40 CFR 112.1 & 761) | | X |
| 11 | Violate water quality standards (WAC-173-200, Table 1)? | | X |

### IMPACT TO LAND

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 12 | Conflict with existing zoning or land use? | | X |
| 13 | Involve hazardous, radioactive, PCB, or asbestos waste? | X | |
| 14 | Cause erosion? | | X |
| 15 | Require an excavation permit? | X | |
| 16 | Disturb an undeveloped area? | X | |

### GENERAL

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 17 | Cause other than a minor or temporary increase in noise level? | | X |
| 18 | Make a long-term commitment of large quantities of nonrenewable resources? | | X |
| 19 | Require new utilities or modifications to utilities? | X | |
| 20 | Use pesticides, carcinogens, or toxic chemicals? | X | |
| 21 | Require radiation work permit? | X | |
| 22 | Occur on Arid Lands Ecology Reserve or Wahluke Slope? | | X |

The items marked "yes" in the Environmental Impact Checklist located above, are addressed in the following paragraphs:

5. Well development and sampling would require purging of groundwater. Depending upon the location of the well, purgewater would be discharged to the ground or contained in compliance with the Strategy for Handling and Disposing of Purgewater at the Hanford Site, Washington.

8. Well development in cased wells drilled deeper than unconfined aquifer has the potential for interconnection.

9. Groundwater and vadose zone wells and test pits might be installed as needed in accordance with state and federal regulations to detect contaminant releases to the environment, facilitate the remediation and closure phases of each site, and ensure that remediation is effective.

13. Small quantities of hazardous and nonhazardous solid waste, radioactive, Polychlorinated Biphenyls, and/or asbestos waste might be created by these actions. All waste would be handled and disposed of in accordance with contractor procedures and standards, federal and state regulations, and DOE orders and guidance. Waste would be dispositioned in existing Hanford Site waste management units, or approved permitted offsite facilities.

15. An excavation permit prior to starting work would be required which addresses biological and cultural resources for each instance in which the ground would be disturbed.

16. Intrusive characterization efforts such as groundwater monitoring wells or test pits might be located in undeveloped areas, if determined necessary for reasons such as to determine regulatory compliance or to confirm modeled groundwater contaminant flows.

19. Laboratory and field operations may require minor alterations of existing utilities.

20. Some characterization, testing, and laboratory actions may involve the use of toxic chemicals. Standard laboratory safety practices would be followed.

21. In the event that work would occur in areas where radiation work permits would be required, workers would be properly trained and would follow all applicable regulations and safety requirements. Work would be governed by the As Low As Reasonably Achievable principles, applicable state and federal regulations, DOE Orders, and contractor guidelines.

SENSITIVE RESOURCES REVIEWS

Cultural, Biological, Historical, Archeological, Wetlands and Floodplains Resource Reviews would be conducted for each use of the CX as appropriate wherever the work might impact such resources. Documentation for each use of the CX would be maintained according to contractor procedures and DOE requirements.

# CATEGORICAL EXCLUSION DETERMINATION FOR MICROBIOLOGICAL AND BIOMEDICAL RESEARCH PROJECTS, AND DIAGNOSTIC AND TREATMENT ACTIVITIES, HANFORD SITE RICHLAND, WASHINGTON

**PROPOSED ACTION:** The U.S. Department of Energy (DOE), Richland Operations Office (RL) proposes to conduct microbiological and biomedical research projects through the Pacific Northwest National Laboratory (PNNL) and biomedical diagnostic and treatment activities through the Hanford Environmental Health Foundation (HEHF).

**LOCATION OF ACTION:** Buildings and structures that are owned and leased by both DOE and Battelle on the Hanford site, as well as other offsite buildings and structures that are used to conduct work for RL, PNNL, or HEHF.

**DESCRIPTION OF THE PROPOSED ACTION:** The proposed action would be to conduct microbiological and biomedical projects to support the following general research areas:

- diagnostic products, which would provide early detection of disorders or measurement of exposures with sensitive, generally non-invasive devices and systems;
- therapeutic products, which would provide targeted delivery of medical therapeutics with minimal adverse effects;
- technology and systems management products, which would improve health care delivery processes and systems through re-engineering and policy reform;
- developing a molecular-level understanding of the physical, chemical, and biological processes that underlie environmental remediation, waste processing and storage, and human health effects; and
- the beneficial use of biomedical ultrasonics, bioelectromagnetics, molecular toxicology, and medical isotopes.

Microbiological and biomedical research would include those activities that are conducted under Biosafety Levels 1 and 2[1], as identified in "Biosafety in Microbiological and Biomedical Laboratories." Actions that involve Biosafety Levels 3 or 4 (or those using inhalable or aerosol agents that may cause serious or potentially life-threatening disease) would not be conducted under this CX.

HEHF supports two missions for DOE that would be addressed by this CX: (1) provide occupational health risk management and (2) provide occupational health services to personnel at Hanford. The health risk management program helps to identify and analyze the hazards that Hanford personnel face in the work environment. The occupational health services provide elements such as occupational medicine and nursing, medical surveillance, ergonomics

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[1] Level 1 activities involve well-characterized agents not known to cause disease in healthy adult humans and pose minimal potential hazard to laboratory personnel and the environment. Level 2 activities involve agents of moderate potential hazard to personnel and the environment. It differs from Level 1 activities in that (1) laboratory personnel have specific training in handling pathogenic agents, (2) access to the laboratory is limited when work is being conducted, (3) extreme precautions are taken with contaminated sharp items, and (4) certain procedures in which infectious aerosols or splashes may be created are conducted in biological safety cabinets or other physical containment equipment.

assessment, exercise physiology, psychology and counseling, fitness for duty evaluations, immediate health care, health education, industrial hygiene, and health, safety, and risk assessments.

DOE funds a variety of activities at PNNL that are currently covered under the bench-scale CX, but which are better addressed by this microbiological and biomedical research CX. These research activities include efforts such as the development of real-time ultrasonic visualization of bloodflow, automated lung ventilation diagnosis, ultrasonic measurement of bone density, dissolvable vascular connectors, in-vivo and in-vitro effects of magnetic fields, biological intake and exhalation rate of volatile organic compounds (using rodents), analysis of nuclear magnetic resonance spectroscopy, medical 3D imaging, optical in-vivo blood characterization, portable ultrasensitive biological sensors, and radium-223 immunoconjugates for cancer therapy. PNNL expects growth in the microbiological and biomedical fields over the next several years.

The majority of the PNNL microbiological and biomedical research activities occur in facilities such as 2400 Stevens, 326, 331, Sigma V, PSL, Math, RTL, LSL II, and the Environmental Molecular Sciences Laboratory. Ongoing activities also include collaboration with other laboratories, research hospitals, and other federal agencies. PNNL staff occasionally offer microbiological and biomedical technical assistance to offsite groups and organizations and participate in offsite research and clinical trials. These types of activities would be addressed by this CX determination. The majority of HEHF activities occur in the Hanford Square Buildings and individual health care centers.

The proposed action includes the operation and minor modification (if necessary) of facilities used for microbiological and biomedical projects and the purchase, installation, and eventual removal of research equipment such as laminar flow hoods, biological safety cabinets, gloveboxes, lasers, ultrasonic instrumentation, centrifuges, etc. These research projects would include those actions foreseeably necessary for implementation, such as associated transportation activities, waste disposal activities, small-scale decommissioning of individual rooms and laboratories, and award of grants and contracts. Each proposed activity must meet the CX eligibility criteria (10 Code of Federal Regulations [CFR] 1021.410) and all of the following criteria:

1. Each activity would be conducted within existing or newly modified structures that provide appropriate safety systems, exhaust ventilation, air filtration, and additional confinement or controls appropriate to the nature of the materials and equipment used in the project.

2. Each activity would comply with applicable administrative controls and requirements identified in the Facility Use Agreement or equivalent procedure established for the facility in which the work would be conducted. Facility Use Agreements outline specific requirements for elements such as safety class systems, operating parameters, radiological controls, and entry requirements.

3. Each activity could use hazardous and/or radioactive materials, should the use be necessary to the research project. Inventories would be maintained at the lowest practicable levels while remaining consistent with existing safety or hazards analyses, continuing operations, and research goals.

4. All releases of liquid and/or airborne substances (i.e., chemicals, radionuclides) to the environment would be compliant with existing permits, local, state, and federal regulations, DOE Orders, and PNNL or HEHF guidelines, as applicable.

5. Types of waste generated by each activity would be limited to those with an available treatment, storage, or disposal pathway. Volumes of waste generated by each activity would be reduced as much as possible by pollution prevention measures and waste minimization practices.

6. Wastes generated by each activity would be handled, packaged, transported, stored, and/or disposed of in accordance with applicable local, state, and federal regulations, DOE Orders, and PNNL or HEHF guidelines.

7. If human subjects are involved in any aspect of biomedical research, protocols developed by the PNNL Institutional Review Board for Human Subject Research would be rigorously followed in accordance with 10 CFR 745. If animal subjects are involved, protocols from the "Guide for the Care and Use of Laboratory Animals," as well as regulations from the U.S. Department of Agriculture and Public Health Service would be followed.

Funding for the proposed activities would be obtained on a project-specific basis from DOE Program Secretarial Offices or other sources.

CX TO BE APPLIED: The following CX is listed in the DOE NEPA Implementing Procedures, 10 CFR 1021, Appendix B to Subpart D, published in the Tuesday, July 9, 1996, Federal Register (61 FR 36221):

B3.12 "Siting, construction (or modification), operation, and decommissioning of microbiological and biomedical diagnostic, treatment and research facilities (excluding Biosafety Level 3 and Biosafety Level 4; reference: Biosafety in Microbiological and Biomedical Laboratories, 3rd Edition, May 1993, U.S. Department of Health and Human Services Public Health Service, Centers for Disease Control and Prevention, and the National Institutes of Health (HHS Publication No. (CDC) 93-8395)) including, but not limited to, laboratories, treatment areas, offices, and storage areas, within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Operation may include the purchase, installation and operation of biomedical equipment, such as commercially available cyclotrons that are used to generate radioisotopes and radiopharmaceuticals, and commercially available biomedical imaging and spectroscopy instrumentation."

ELIGIBILITY CRITERIA: The proposed activity meets the eligibility criteria of 10 CFR 1021.410(b), since there are no extraordinary circumstances that might affect the significance of the environmental effects of the proposal. The proposed activity is not connected to other actions with potentially significant impacts (40 CFR 1508.25[a][1]), or with cumulatively significant impacts (40 CFR 1508.25[a][2]), and is not precluded by 10 CFR 1021.211.

The "Integral Elements" of 10 CFR 1021 are satisfied as discussed in the following table:

| INTEGRAL ELEMENTS, 10 CFR 1021, APPENDIX B, SUBPART D | |
|---|---|
| WOULD THE PROPOSED ACTION: | COMMENT OR EXPLANATION: |
| Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, or health (ES&H), including requirements of DOE and/or Executive Orders? | The proposed action would not threaten a violation of ES&H regulations or Executive or DOE Orders. |
| Require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions? | Wastes created by the proposed action would be treated, stored, or disposed of in existing waste facilities. |
| Disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases? | No pre-existing hazardous substances pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products would be disturbed in a manner that would result in uncontrolled releases. |
| Adversely affect environmentally sensitive resources including but not limited to:<br><br>(I) Property (e.g., sites, buildings, structures, objects) of historic, archeological, or architectural significance designated by federal, state, or local governments or property eligible for listing on the National Register of Historic Places<br><br>(ii) Federally-listed threatened or endangered species or their habitat (including critical habitat), Federally-proposed or candidate species or their habitat or state-listed endangered or threatened species or their habitat<br><br>(iii) Wetlands regulated under the Clean Water Act (33 U.S.C. 1344) and floodplains<br><br>(iv) Federally- and state-designated wilderness areas, national parks, national natural landmarks, wild and scenic rivers, state and federal wildlife refuges, and marine sanctuaries<br><br>(v) Prime agricultural lands<br><br>(vi) Special sources of water (such as sole-source aquifers, wellhead protection areas, and other water sources that are vital in a region)<br><br>(vii) Tundra, coral reefs, or rainforests? | No environmentally sensitive resources would be adversely affected. When appropriate, cultural and/or biological resources reviews would be performed to ensure that sensitive resources are not adversely affected by the proposed action.<br><br>The proposed action would not adversely affect floodplains or wetlands regulated under the Clean Water Act; wilderness areas or other specially designated areas; prime agricultural lands; special sources of water; or tundra, coral reefs, or rainforests. |

**COMPLIANCE ACTION:** I have reviewed the documentation and have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature: Paul F.X. Dunigan Jr. Date: 3/12/97
Paul F. X. Dunigan, Jr.
RL NEPA Compliance Officer

Attachment:
Checklist Summarizing Environmental Impacts

Distribution w/attach:
S. M. McInturff, HEHF
R. C. Phillips, PNNL
K. A. Piper, HEHF
R. S. Weeks, PNNL

## Attachment 1

The following checklist summarizes environmental impacts that were considered. Answers to relevant questions are explained in detail in the text following the checklist.

### IMPACT TO AIR

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 1 | Result in more than minor and temporary gaseous discharges to the environment? | | X |
| 2 | Release other than nominal and temporary particulates or drops to the atmosphere? | | X |
| 3 | Result in more than minor thermal discharges? | | X |
| 4 | Increase offsite radiation dose to >0.1 mrem (40 CFR 61 Subpart H)? | X | |

### IMPACT TO WATER

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 5 | Discharge any liquids to the environment? | X | |
| 6 | Discharge heat to surface or subsurface water? | | X |
| 7 | Release soluble solids to natural waters? | | X |
| 8 | Provide interconnection between aquifers? | | X |
| 9 | Require installation of wells? | | X |
| 10 | Require a Spill Control and Prevention and Countermeasures Plan? (40 CFR 112 and 761) | | X |
| 11 | Violate water quality standards (WAC 173-200, Table 1)? | | X |

### IMPACT TO LAND

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 12 | Conflict with existing zoning or land use? | | X |
| 13 | Involve hazardous, radioactive, PCB, or asbestos waste? | X | |
| 14 | Cause erosion? | | X |
| 15 | Occur on the Arid Lands Ecology Reserve or Wahluke Slope? | | X |
| 16 | Require an excavation permit? | X | |
| 17 | Disturb an undeveloped area? | | X |

### GENERAL

| | Would the proposed action: | YES | NO |
|---|---|---|---|
| 18 | Cause other than a minor or temporary increase in noise level? | | X |
| 19 | Make a long-term commitment of large quantities of nonrenewable resources? | | X |
| 20 | Require new utilities or modifications to utilities? | X | |
| 21 | Use pesticides, carcinogens, or toxic chemicals? | X | |
| 22 | Require a radiation work permit? | X | |

4. Research involving biomedical use of radioactive isotopes might result in instances where unabated offsite radiological doses are greater than 0.1 mrem for the maximally exposed offsite individual. In accordance with the National Emission Standards for Hazardous Air Pollutants (40 CFR 61), continuous air sampling is in place for those facilities whose cumulative emissions are likely to be above 0.1 mrem. In addition, high-efficiency particulate air filters are in place to control emissions. Unabated radiological emissions would not be released from microbiological or biomedical research activities.

5. Liquid wastes generated by proposed activities would be discharged into existing treatment systems or in accordance with applicable regulations. For activities conducted at the Hanford Site, liquid wastes would be processed through systems such as the City of Richland publicly-owned treatment works, process sewer, retention process sewer, septic systems, or radioactive liquid waste sewer, whichever is appropriate. Liquid waste treatment and disposal would be compliant with applicable local, state, and federal regulations and permit requirements, DOE Orders, and PNNL or HEHF guidelines.

13. Proposed activities might result in small quantities of hazardous, radioactive, PCB, and/or asbestos wastes. If unrecyclable, such wastes would be characterized, handled, packaged, transported, stored, and/or disposed of in existing Hanford Site or offsite treatment, storage, and disposal facilities in accordance with applicable local, state, and federal regulations, DOE Orders, and PNNL or HEHF guidelines.

16. Facility modification to support microbiological or biomedical research might require an excavation permit if earth-disturbing activity is involved.

20. Proposed activities might require minor modifications to utilities that serve existing facilities.

21. Proposed activities might use small quantities of pesticides, carcinogens, and/or toxic chemicals. Project inventories would be maintained at the lowest practicable levels, and chemicals would be recycled or regenerated if possible.

22. Proposed activities would be performed in compliance with as low as reasonably achievable principles, applicable state and federal regulations, DOE Orders, and PNNL guidelines. The radiation received by workers during the performance of activities would be administratively controlled below DOE limits as defined in 10 CFR 835.202(a). Under normal circumstances, those limits control individual radiation exposure to below an annual effective dose equivalent of five rem.

CULTURAL RESOURCES REVIEW: Minor facility modifications foreseeably necessary to perform microbiological and biomedical research would be conducted under this CX. If the facility is listed in Appendix C, Table 1 of the "Programmatic Agreement for the Maintenance, Deactivation, Alteration, and Demolition of the Built Environment on the Hanford Site," the Hanford Cultural Resources Laboratory would

review the proposed modification activity prior to commencement. This review would evaluate potential impacts to culturally sensitive resources, including consideration of the historical significance of the facilities. In accordance with the PA Section (V) (C), the Project will assess the contents of each affected facility to locate and identify artifacts or museum property prior to activities associated with this CX.

BIOLOGICAL RESOURCES REVIEW: A biological resources review would be completed for facility modification activities with the potential to adversely affect sensitive plant and animal species. This review would not generally be required for those activities that are internal to a building or facility.

# CATEGORICAL EXCLUSION FOR
# Palouse Drilling Project Located Near
# Winona and Washtucna Washington

**Proposed Action:**

Golder Federal Services, Inc. is proposing to do small-scale intrusive drilling (two test holes) in eastern Washington.

**Location of Proposed Action:**

The two drilling sites are located in the Palouse Region of eastern Washington. The first site is near Winona, located 80 miles northeast of Richland. The second site is near Washtucna, located 60 miles northeast of Richland.

**Description of Proposed Action:**

The proposed action involves small-scale intrusive drilling activities. Two vertical test holes will be drilled. The first hole near Winona will be drilled to about 190 ft. The second hole near Washtucna will be from 50-100 ft. deep. Both holes will be drilled using standard truck-mounted auger drilling equipment with work slated to begin in early January 1996 and taking approximately one week to complete.

The purpose of the Palouse Drilling Project is to collect aseptic soil samples for microbiological characterization and chloride mass balance analysis. The project is funded under the Subsurface Science Program (SSP), managed by the U.S. Department of Energy's Office of Health and Environmental Research and Pacific Northwest National Laboratory (PNNL), Richland, Washington. One of the major opjectives of the SSP is to gain an understanding of the distribution and population dynamics of microorganisms in the subsurface environment, and to better understand their potential application to bioremediation of subsurface contaminants at DOE facilities. The soil samples will be processed at the PNNLs Life Science Laboratory II.

The proposed action will be conducted on privately owned farm properties which have been used for wheat production for decades. The hollow stem auger drilling and associated sampling actions do not produce significant amounts of fugitive dust and the proposed action is expected to generate much less dust than normal farming practices in the site area. No water, mud, or other circulating fluids would be used in drilling the test holes. This is necessary to avoid contaminating the desired subsurface soil samples with naturally occurring surface microorganisms. Once drilling is completed, site restoration activities would be conducted at both drilling sites. The test holes will be backfilled in accordance with state regulations and the soil cuttings at the surface will be distributed around each drill site, such that subsequent farming would readily incorporate them into the fields.

**Categorical Exclusion (CX) to be Applied:**

The following CXs are listed in 10 *Code of Federal Regulations* (CFR) 1021, "National Environmental Policy Act Implementing Procedures," Subpart D, Appendix B, published in the Friday, April 24, 1992, 57 *Federal Register* 15151:

B3.1 Site characterization and environmental monitoring, including siting, construction, operation, and dismantlement of closing (abandonment) of characterization and monitoring devices and siting, construction, and operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis. Activities covered include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. Specific activities include, but are not limited to:

(f) Sampling and characterization of water, soil, rock, or contaminants;

3.6 Indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis) within existing laboratory facilities.

**ELIGIBILITY CRITERIA**

Since there are no extraordinary circumstances that may affect the significance of the environmental effects of the proposal, the proposed activity meets the eligibility criteria of 10 CFR 1021.410(b), as shown in the following table. The proposed activity is not "connected" to other actions with potentially significant impacts (40 CFR 1508.25[a][1]), or with cumulatively significant impacts (40 CFR 1508.25[a][2]), and is not precluded by 10 CFR 1021.211.

The "Integral Elements" of 10 CFR 1021 are satisfied as discussed in below.

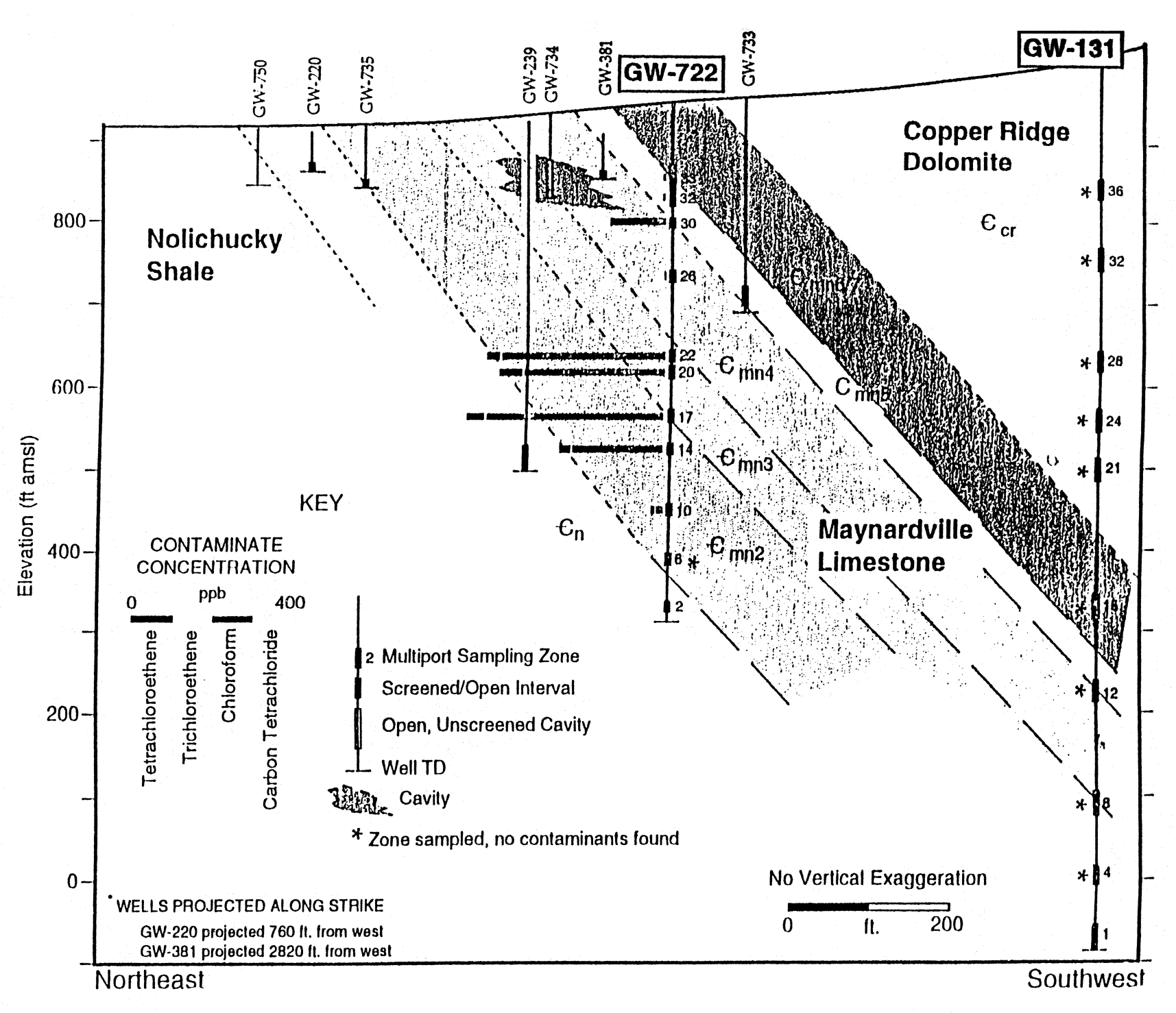
| INTEGRAL ELEMENTS 10 CFR 1021, SUBPART D, APPENDIX B | |
|---|---|
| Would the Proposed Action: | Comment or explanation: |
| Threaten a violation of environmental, safety or health laws, regulations, or DOE orders? | No laws, regulations, or Orders would be violated by the proposed action. |
| Require siting, construction or major expansion of waste treatment, storage, or disposal facilities? | Wastes created by the proposed action would be disposed of in existing waste facilites. |
| Disturb hazardous substances preexisting in the environment, allowing uncontrolled releases? | No liquids would be discharged to the ground by the proposed action. |
| Adversely affect archaeological or historical property? | Properties if archeological or historical significance would not be adversely affected. |
| Adversely affect federally- or state listed, proposed or candidate, threatened or endangered species or habitat? | The proposed action would not adversely affect any federally or state listed, proposed or candidate, threatened or endangered species or habitat. |
| Adversely affect floodplains or wetlands? | The proposed action would not take place on a floodplain or wetland. |
| Adversely affect wild and scenic rivers, state or federal wildlife refuges or specially designated areas? | The proposed action would not take place in a specially designated area. |
| Affect special sources of water? | No special sources of water would be affected. |

I have reviewed the attached documentation and have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature/Date: Paul F. X. Dunigan, Jr. 12/22/95

Paul F. X. Dunigan, Jr.
RL NEPA Compliance Officer

Attachments


GW-750
GW-220
GW-735
GW-239
GW-734
GW-381
GW-722
GW-733
GW-131
Copper Ridge Dolomite
Nolichucky Shale
Maynardville Limestone
Elevation (ft amsl)
800
600
400
200
0
KEY
CONTAMINATE CONCENTRATION
0
ppb
400
Tetrachloroethene
Trichloroethene
Chloroform
Carbon Tetrachloride
2 Multiport Sampling Zone
Screened/Open Interval
Open, Unscreened Cavity
Well TD
Cavity
* Zone sampled, no contaminants found
No Vertical Exaggeration
0 ft. 200
WELLS PROJECTED ALONG STRIKE
GW-220 projected 760 ft. from west
GW-381 projected 2820 ft. from west
Northeast
Southwest

*Both Locations*

- The rate of transport and impact of matrix diffusion over relatively long distances in the Maynardville Limestone deep exit pathways will be determined by using multiple tracer injection tests.

- The results of the tracer tests can be used by the Integrated Water Quality Program (IWQP) to determine meaningful sampling frequencies and the impact of matrix diffusion on the rate of aquifer restoration (i.e., expected change in groundwater concentration) in response to remedial actions. This will become more important, especially at sites where natural attenuation is selected as the remedial option.

- Testing at both sites will provide information the regulators and public have requested regarding the monitoring, and fate and transport within the exit pathway plumes.

*BCV test site*

- The likely rate of groundwater restoration in the Maynardville Limestone from source actions taken at the BYBY and S-3 ponds can be better determined. Using the results of the tracer test, the information can be used to determine monitoring frequencies for the uranium, nitrate, and TCE plumes migrating in the Maynardville Limestone exit pathway.

- The BCV site will be used to test the equipment and tracers prior to conducting the UEFPC test (in GW-722, a Westbay well) where transport mechanisms are not as well understood.

*UEFPC test site*

- The data will be used to determine if the current direction of groundwater flow is east and off site or west toward the UEFPC underdrain, which is on site. This information can be used to determine the monitoring locations the IWQP should be focusing on.

- The information can be used to determine monitoring frequencies for the off-site CT plume in the Maynardville exit pathway. The likely rate of off-site groundwater remediation (concentration change) due to the proposed on-site containment actions can be better determined.

## 3. Scope

The tracer test will be conducted in a similar manner at both locations. Three tracers—ice nucleating agent (INA), bromide, and sulfur hexafluoride (SF6)—will be injected at both locations using the same Westbay downhole equipment. The purpose of using three tracers is to determine the rate of movement of a colloid (i.e., INA) that is theoretically too large to be subject to matrix diffusion relative to the rate of movement of two other tracers that are impacted by matrix diffusion but to different degrees (i.e., bromide and SF6). At the BCV site, a florescent dye tracer will also be injected to assess the impacts of sorption on contaminant transport.