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Revision 0

UC-630, 721

Hanford Patrol Academy Demolition Sites Closure Plan

Date Published
November 1992

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

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STATE ENVIRONMENTAL POLICY ACT

ENVIRONMENTAL CHECKLIST FORMS

FOR

HANFORD PATROL ACADEMY DEMOLITION SITE
CLOSURE PLAN

REVISION 0

November 1992

WASHINGTON ADMINISTRATIVE CODE
ENVIRONMENTAL CHECKLIST FORMS
[WAC 197-11-960]

9 3 1 2 7 5 2 1 8 4 5

A. BACKGROUND

1. Name of proposed project, if applicable:

Closure of the Hanford Patrol Academy Demolition Sites (HPADS).

2. Name of applicants:

U.S. Department of Energy, Richland Field Office (DOE-RL) and Westinghouse Hanford Company (Westinghouse Hanford).

3. Address and phone number of applicants and contact persons:

U.S. Department of Energy
Richland Field Office
P.O. Box 550
Richland, Washington 99352

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

Contact Persons:

J. D. Bauer, Acting Program Manager
Office of Environmental Assurance,
Permits, and Policy
(509) 376-5441

R. E. Lerch, Deputy Director
Restoration and Remediation
(509) 376-5556

4. Date checklist prepared:

November 1992

5. Agency requesting the checklist:

Washington State
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

6. Proposed timing or schedule: (including phasing, if applicable):

Closure of the HPADS would begin and would be completed within 180 days after approval of the closure plan by the Washington State Department of Ecology (Ecology).

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

There are no additions or expansions planned following closure. The HPADS is located within the Hanford Patrol Academy firing range. It is planned that the Hanford Patrol would occupy the firing range area and continue training throughout the closure and postclosure periods. Training and closure activities would be coordinated.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

This *State Environmental Policy Act* (SEPA) *of 1971* Environmental Checklist is being submitted to the Ecology concurrently with the HPADS closure plan.

General Hanford Site information is found in the *Hanford Site National Environmental Policy Act (NEPA) Characterization* document, PNL-6415, Revision 4, Pacific Northwest Laboratory, 1991, Richland, Washington.

In accordance with the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), additional information concerning the HPADS is located in the Waste Information Data System.

9. Do you know whether applications are pending for government approvals of other proposals directly affecting the property covered by your proposal? if yes, explain.

No applications to government agencies are known to be pending.

10. List any government approvals or permits that will be needed for your proposal, if known.

In accordance with the Tri-Party Agreement, Ecology is the lead regulatory agency that will approve the HPADS closure plan pursuant to the requirements of Washington Administrative Code (WAC) 173-303-610 and 40 Code of Federal Regulations (CFR), Parts 265.381 and 270.1. A *National Environmental Policy Act* (NEPA) *of 1969* review will be required before closure can proceed.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

The proposed action is the clean closure of the HPADS. The HPADS consists of two small demolition soil pits located within the Hanford Patrol Academy training area, specifically the known distance rifle range

(KD range or #5 range). From 1984 through October 1991, discarded explosive, reactive, and shock-sensitive nonradioactive chemicals were detonated periodically in these soil pits. The soil pits are no longer used for the treatment of waste.

In the early years, rifle fire was used to detonate individual chemical containers. Since late 1984, explosives were used to initiate the thermal treatment process. The discarded chemicals and explosives were placed in a specially dug hole to control the process.

Because of the volatile nature of the chemicals and the use of explosives for thermal treatment, the closure strategy is to test for demolition residues that might remain, and to verify that any residues that might exist do not pose a risk to human health or the environment. Suitable field screening techniques would be used to assess the areas to be closed and the adequacy of the field screening would be confirmed by laboratory analysis of field samples. Upon the lead regulatory agency concurrence with the field screening and laboratory confirmation results, randomly selected samples might be used to document closure. If waste residues are found to pose any threat to public health or the environment, soil removal or other measures will be undertaken to minimize such hazards before closure is complete. All equipment used in performing closure activities would be decontaminated or disposed of at a permitted facility.

The original demolition sites initially were small, shallow pits approximately 1.5 feet (0.5 meter) deep and 10 feet (3.0 meters) in diameter. These pits were expanded slightly with time and the closure areas are now larger. The closure area for Pit Number One is defined as 33 feet (10 meters) by 98 feet (30 meters) and for Pit Number Two the closure area is defined as 108 square feet (10 square meters). Both pits are defined as 3.0 feet (1.0 meter) deep. The final closure areas will be determined by the field screening surveys and/or the analytical results.

Postclosure care would be required only if the treatment unit in question cannot attain closure. If the underlying soils or the groundwater is contaminated, the site will not be considered closed until the remediation of the 1100-EM-1 operable unit under CERCLA is complete.

12. **Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.**

The HPADS is located on a firing range within the Hanford Patrol Academy, which is about 2 miles (3.2 kilometers) south-southwest of the 300 Area

on the Hanford Site and 0.5 mile (0.8 kilometer) north of the Horn Rapids Road, which is the northern boundary of the city of Richland. The Hanford Patrol Academy is in Section 8, Township 10 N, Range 28 E.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other_____.

Rolling, slightly sloped sand dunes.

b. What is the steepest slope on the site (approximate percent slope)?

42 percent. The angle of repose of the sand dunes is approximately 30 degrees.

c. What general types of soils are found on the site? (for example, clay, sandy gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Sand and sandy gravel.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Small migrating sand dunes are present in the area but are stabilized by periodic firing range maintenance.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

The closure areas would be graded for safety reasons during closure to match the surrounding surface.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

No.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None.

h. **Proposed measures to reduce or control erosion, or other impacts to the earth, if any:**

None.

2. **Air**

a. **What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.**

There could be minor dust and vehicle exhaust from closure activities. No volatile residuals are expected to be in the soil.

b. **Are there any off-site sources of emissions or odors that may affect your proposal? If so, generally describe.**

No.

c. **Proposed measures to reduce or control emissions or other impacts to the air, if any?**

None.

3. **Water**

a. **Surface**

1) **Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

No.

2) **Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

No.

3) **Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

None.

4) **Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.**

No.

5) **Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

No.

6) **Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.**

No.

b. **Ground**

1) **Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.**

No.

2) **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

None.

c. **Water Run-off (including storm water)**

1) **Describe the source of run-off (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.**

The Hanford Site receives approximately 6 to 7 inches (15 to 18 centimeters) of annual precipitation that seeps into the ground through the porous soils. Because of the low rainfall and the warm climate, this water returns to the air through evapotranspiration.

2) **Could waste materials enter ground or surface waters? If so, generally describe.**

No.

d. Proposed measures to reduce or control surface, ground, and run-off water impacts, if any:

None.

4. Plants

a. Check or circle the types of vegetation found on the site.

___ **deciduous tree: alder, maple, aspen, other**
___ **evergreen tree: fir, cedar, pine, other**
___ **shrubs**
_X_ **grass**
___ **pasture**
___ **crop or grain**
___ **wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other**
___ **water plants: water lily, eelgrass, milfoil, other**
_x_ **other types of vegetation**

Forbes and grasses seasonally might be present.

b. What kind and amount of vegetation will be removed or altered?

Small quantities of forbes and grasses might be removed during closure. Periodically throughout the Hanford Patrol Academy firing range complex, the vegetation is removed systematically to minimize potential brush fires and for firing range safety precautions.

c. List threatened or endangered species known to be on or near the site.

None. Additional information on the Hanford Site environment can be found in the environmental document referred to in the answer to Checklist Question A.8.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

None.

5. Animals

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other:.....
mammals: deer, bear, elk, beaver, other:.....
fish: bass, salmon, trout, herring, shellfish, other:.....

There are many species of birds and animals on the 560 square mile (1,450 square kilometer) Hanford Site and some occasionally might be seen near the HPADS; however, there are no animal species that are specifically known to use the small area of the HPADS. Additional information on the Hanford Site animal species can be found in the environmental document referred to in the answer to Checklist Question A.8.

b. List any threatened or endangered species known to be on or near the site.

The HPADS site is not known to be used by any threatened or endangered species. Additional information concerning endangered and threatened species on the Hanford Site can be found in the environmental document referred to in the answer to Checklist Question A.8.

c. Is the site part of a migration route? If so, explain.

The Hanford Site and the adjacent Columbia River are part of the broad Pacific Flyway for waterfowl migration and other birds also migrate along the river. Birds might fly over the closure areas.

d. Proposed measures to preserve or enhance wildlife, if any:

None.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

None.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None

7. Environmental Health

a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.**

It is believed that the waste inventory that was treated, which consisted of discarded explosive, ignitable, and/or reactive, nonradioactive chemical compounds, was totally consumed during the various thermal detonation events. It also is believed that any remaining residues should have been decomposed by the natural processes of oxidation and hydration. It also is possible that negligible amounts of dangerous residues might have remained on the closure areas along with small shards of glass or metal remnants from the containers that were detonated.

1) **Describe special emergency services that might be required.**

Hanford Site security, fire response, and ambulance services are on call at all times in the event of an onsite emergency.

2) **Proposed measures to reduce or control environmental health hazards, if any:**

The field screening and analytical sampling results would determine if there are any remaining residues that pose a threat to human health or the environment. If there are remaining residues, the contaminated soil will be removed and disposed of in approved disposal sites. Removal would be carried out in accordance with approved procedures for removal of dangerous waste.

b. Noise

1) **What type of noise exists in the area which may affect your project (for example: traffic, equipment, operation, other)?**

None.

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.**

There would be minor noise from equipment used for sampling and closure activities during normal day shift operations.

3) **Proposed measures to reduce or control noise impacts, if any:**

None.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The HPADS currently are part of the firing range used for training purposes by the Hanford Patrol.

b. Has the site been used for agriculture? If so, describe.

No portion of the Hanford Site, including the locations of the proposed action, has been used for agricultural purposes since 1943.

c. Describe any structures on the site.

The HPADS is located near an earthen berm that is used for the KD range target butt.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

The Hanford Site is zoned by Benton County as an Unclassified Use (U) district.

f. What is the current comprehensive plan designation of the site?

The 1985 Benton County Comprehensive Land Use Plan designates the Hanford Site as the "Hanford Reservation". Under this designation, land on the Hanford Site may be used for "activities nuclear in nature". Nonnuclear activities are authorized "if and when DOE approval for such activities is obtained".

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

No.

i. Approximately how many people would reside or work in the completed project?

None.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Does not apply. (Refer to answer to Checklist Question B.8.f.)

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

None.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

No structures are proposed.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

None.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. **Could light or glare from the finished project be a safety hazard or interfere with views?**

No.

c. **What existing off-site sources of light or glare may affect your proposal?**

None.

d. **Proposed measures to reduce or control light and glare impacts, if any:**

None.

12. Recreation

a. **What designated and informal recreational opportunities are in the immediate vicinity?**

None.

b. **Would the proposed project displace any existing recreational uses? If so, describe.**

No.

c. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any?**

None.

13. Historic and Cultural Preservation

a. **Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.**

No places or objects listed on, or proposed for, national, state, or local preservation registers are known to be on or next to the HPADS. Additional information regarding the cultural resources on the Hanford Site can be found in the environmental documents referred to in the answer to Checklist Question A.8.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

There are no known archaeological, historical, or Native American religious sites on or next to the HPADS. Additional information regarding this can be found in the environmental documents referenced in the answer to Checklist Question A.8.

c. Proposed measures to reduce or control impacts, if any:

None.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Does not apply.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The HPADS is not publicly accessible and, therefore, is not served by public transit.

c. How many parking spaces would the completed project have? How many would the project eliminate?

None.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

None.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

None.

g. Proposed measures to reduce or control transportation impacts, if any:

None.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any:

None.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:

None.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

None.

SIGNATURES

The above answers are true and complete to the best of my knowledge. We understand that the lead agency is relying on them to make its decision.

James D. Bauer

James D. Bauer, Acting Program Manager
Office of Environmental Assurance,
Permits, and Policy
U.S. Department of Energy
Richland Field Office

11/20/92
Date

R E Lerch

R. E. Lerch, Deputy Director
Restoration and Remediation
Westinghouse Hanford Company

10-30-92
Date

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HANFORD PATROL ACADEMY DEMOLITION SITES CLOSURE PLAN

FOREWORD

The Hanford Facility is owned by the U.S. Government and operated by the U.S. Department of Energy, Richland Field Office. Dangerous waste and mixed waste (containing both radioactive and dangerous components) are managed and produced on the Hanford Facility, a portion of the 560 square mile (1,450 square kilometer) Hanford Site. The dangerous waste is regulated in accordance with the *Resource Conservation and Recovery Act of 1976* and the *State of Washington Hazardous Waste Management Act of 1976* (as administered through the Washington State Department of Ecology *Dangerous Waste Regulations*, Washington Administrative Code 173-303). The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act of 1954*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the *Resource Conservation and Recovery Act* and Washington Administrative Code 173-303.

For purposes of the *Resource Conservation and Recovery Act* and the Washington State Department of Ecology *Dangerous Waste Regulations*, the Hanford Facility is considered to be a single facility. The single dangerous waste permit idenytification number issued to the Hanford Facility by the U.S. Environmental Protection Agency and the Washington State Department of Ecology is U.S. Environmental Protection Agency/State Identification Number WA7890008967. This identification number encompasses over 60 treatment, storage, and/or disposal units within the Hanford Facility. Over half of the treatment, storage, and/or disposal units are no longer operating and will be closed under interim status (using final status standards in Washington Administrative Code 173-303-610).

Westinghouse Hanford Company is a major contractor to the U.S. Department of Energy, Richland Field Office and serves as co-operator of the Hanford Patrol Academy Demolition Sites, the unit addressed in this closure plan.

Westinghouse Hanford Company is identified in the closure plan as a "co-operator" and signs in that capacity. Any identification of Westinghouse Hanford Company as an 'operator' elsewhere in this closure plan is not meant to conflict with Westinghouse Hanford Company's designation as a co-operator but rather is based on Westinghouse Hanford Company's contractual status (i.e., as an operations and engineering contractor) for the U.S. Department of Energy.

The *Hanford Patrol Academy Demolition Sites Closure Plan* consists of a Part A Permit Application (Revision 3) and a closure plan. An explanation of the Part A Permit Application revision is provided at the beginning of the Part A section. The closure plan consists of nine chapters and six appendices.

This *Hanford Patrol Academy Demolition Sites Closure Plan* submittal contains information current as of October 15, 1992.

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COE	U.S. Army Corps of Engineers
DOE-RL	U.S. Department of Energy, Richland Field Office
Ecology	Washington State Department of Ecology
EII	environmental investigation instructions
EPA	U.S. Environmental Protection Agency
HEIS	Hanford Environmental Information System
HPADS	Hanford Patrol Academy Demolition Sites
IRIS	integrated risk information system (database)
KD	known distance
QAPjP	quality assurance project plan
QI	quality instruction
QR	quality requirement
RCRA	*Resource Conservation and Recovery Act of 1976*
SMO	sample management organization
TCL	target compound list
TIC	tentatively identified compounds
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
WAC	Washington Administrative Code

DEFINITION OF TERMS

Definitions are based on use throughout this document.

Accuracy--The degree of agreement between a measurement (or the mean value of a set of measurements) to the true value. For purposes of sampling activities, accuracy is the measure of the bias in a measurement system. Sampling accuracy normally is assessed through the evaluation of sample blanks, while analytical method accuracy and specific sample matrix effects are assessed through the analysis of control standards and spiked samples.

Audit--For the purposes of sampling activities, audits are considered to be systematic checks to verify the quality of operation of one or more elements of the total measurement system. In this sense, audits could be of two types:

(1) performance audits, in which quantitative data are independently obtained for comparison with data routinely obtained in a measurement system or (2) system audits, involving a qualitative onsite evaluation of laboratories or other organizational elements of the measurement system for compliance with established quality assurance program and procedure requirements. For environmental investigations at the Hanford Site, performance audit requirements are fulfilled by periodic submittal of blind samples to the primary laboratory or the analysis of split samples by an independent laboratory. System audit requirements are implemented through the use of standard surveillance procedures.

Comparability--For the purposes of sampling activities, comparability is an expression of the relative confidence with which one data set might be compared with another.

Completeness--For the purposes of sampling activities, completeness is a quantitative parameter expressing the percentage of measurements judged to be valid.

Deviation--For the purpose of sampling activities, deviation refers to a planned departure from established criteria that might be required as a result of unforeseen field situations or that might be required to correct ambiguities in procedures that may arise in practical applications.

Facility/facility--Dependent on context, the term 'facility', as used in this closure plan, could refer to the following.

The Hanford Facility is a single *Resource Conservation and Recovery Act* (RCRA) *of 1976* facility, identified by the EPA/State Identification Number WA7890008967, that consists of over 60 treatment, storage, and/or disposal (TSD) units included in the *Hanford Facility Dangerous Waste Part A Permit Application* (DOE-RL 1988b). The Hanford Facility consists of the contiguous portion of the Hanford Site that contains these TSD units and, for the purposes of RCRA, is owned and operated by the U.S. Department of Energy (excluding lands north and east of the Columbia River, river islands, lands owned by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and lands owned by or leased to the state of Washington).

A facility as defined in WAC 173-303-040, i.e., building nomenclature commonly used at the Hanford Facility. In this context, the term 'facility' remains as part of the title for various TSD units (e.g., 2727-S Storage Facility, Hexone Storage and Treatment Facility).

Nonconformance--A nonconformance is a deficiency in characteristic, documentation, or procedure that renders the quality of material, equipment, services, or activities unacceptable or indeterminate. When the deficiency is of a minor nature, does not effect a permanent or significant change in quality if it is not corrected, and can be brought into conformance with immediate corrective action, the deficiency shall not be categorized as a nonconformance. However, if the nature of the condition is such that it cannot be immediately and satisfactorily corrected, it shall be documented in

compliance with approved procedures and brought to the attention of management for disposition and appropriate corrective action.

Precision--Precision is a measure of the repeatability or reproducibility of specific measurements under a given set of conditions. Specifically, precision is a quantitative measure of the variability of a group of measurements compared to their average value. Precision normally is expressed in terms of standard deviation, but also could be expressed as the coefficient of variation (i.e., relative standard deviation) and range (i.e., maximum value minus minimum value). Precision is assessed by means of duplicate and/or replicate sample analysis.

Quality assurance--For the purposes of sampling activities, quality assurance refers to the total integrated quality planning, quality control, quality assessment, and corrective action activities that collectively ensure that the data from monitoring and analysis meet all end user requirements and/or the intended end use of the data.

Quality assurance project plan--The quality assurance project plan is an orderly assembly of management policies, project objectives, methods, and procedures that defines how data of known quality will be produced for a particular project or investigation.

Quality control--For the purposes of sampling activities, quality control refers to the routine application of procedures and defined methods to the performance of sampling, measurement, and analytical processes.

Replicate sample--Replicate samples are two aliquots removed from the same sample container in the laboratory and analyzed independently.

Representativeness--For the purposes of sampling activities, representativeness is the degree to which data accurately and precisely represent a characteristic of a population parameter, variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of a sampling program.

Site-wide background--The natural background established for the Hanford Site. Includes all contributions from anthropogenetic sources unrelated to Hanford Site operations.

Validation--For the purposes of sampling activities, validation refers to a systematic process of reviewing a body of data against a set of criteria to provide assurance that the data are acceptable for their intended use.

Verification--For the purposes of sampling activities, verification refers to the process of determining whether procedures, processes, data, or documentation conform to specified requirements. Verification activities might include inspections, audits, surveillances, or technical review.

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PART A

The Part A, Form 1, included in this closure plan was submitted to the Washington State Department of Ecology in May 1988. The Part A, Form 1, consists of three pages.

The original Part A, Form 3, was submitted on November 1, 1985. Revision 1 of the Part A, Form 3, was prepared to add new demolition sites, and was submitted on August 15, 1987. Revision 2 of the Part A, Form 3, was prepared to separate several demolition sites into individual Part A permit applications and to add Westinghouse Hanford Company as co-operator. Revision 2 was submitted on November 16, 1987. Revision 3 of the Part A, Form 3, updates waste codes based on data obtained from the waste inventory.

The Part A, Form 3 (Revision 3), included with this closure plan consists of five pages, one figure, and one photograph.

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FORM 1

State of Washington Department of Ecology

WASHINGTON STATE

DANGEROUS WASTE PERMIT GENERAL INFORMATION

(Read "Form 1 Instructions" before starting)

I. EPA/STATE I.D. NUMBER: WA7 0 9 0 0 0 8 9 6 7

II. NAME OF FACILITY: U.S. DEPARTMENT OF ENERGY-HANFORD SITE

III. FACILITY CONTACT

A. NAME & TITLE (Last, First, & Title): LAWRENCE, MICHAEL J., MANAGER

B. PHONE (area code & no.): 509 376 7395

IV. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: P.O. BOX 550

B. CITY OR TOWN: RICHLAND

C. STATE: WA

D. ZIP CODE: 99352

V. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: HANFORD SITE

B. COUNTY NAME: BENTON

C. CITY OR TOWN: RICHLAND

D. STATE: WA

E. ZIP CODE: 99352

F. COUNTY CODE (if known): 005

VI. SIC CODES (4-digit, in order of priority)

A. FIRST: 9711 (specify) NATIONAL SECURITY

B. SECOND: 8922 (specify) NUCLEAR NONCOMMERCIAL DEVELOPMENT AND EDUCATION

C. THIRD: 9611 (specify) ADMINISTRATION AND GENERAL ECONOMICS PROGRAM

D. FOURTH: 4911 (specify) STEAM-ELECTRIC GENERATION

VII. OPERATOR INFORMATION

A. NAME: DEPARTMENT OF ENERGY-RICHLAND OPERATIONS (DOE-RL)
WESTINGHOUSE HANFORD COMPANY (WHC)

B. Is the name listed in Item VII-A also the owner? ☒ YES ☐ NO **

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL, S = STATE, P = PRIVATE, M = PUBLIC (other than federal or state), O = OTHER (specify)
F (specify)

D. PHONE (area code & no.): 509 376 7395

E. STREET OR P.O. BOX: PO BOX 550/PO BOX 1970

509 376 7803

F. CITY OR TOWN: RICHLAND

G. STATE: WA

H. ZIP CODE: 99352

VIII. INDIAN LAND
Is this facility located on Indian lands? ☐ YES ☒ NO

**DOE-RL: OWNER/CO-OPERATOR; WHC: CO-OPERATOR FOR CERTAIN UNITS ON THE HANFORD SITE.

COMPLETE BACK PAGE

ECY 020-81

93127 21871

IX. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

X. NATURE OF BUSINESS (provide a brief description)

- o NATIONAL DEFENSE NUCLEAR MATERIAL PRODUCTION
- o ENERGY RESEARCH AND TECHNOLOGY DEVELOPMENT
- o DEFENSE NUCLEAR WASTE MANAGEMENT
- o BYPRODUCT STEAM, SOLD FOR ELECTRIC POWER GENERATION

AND SIC 15: BUILDING CONSTRUCTION - GENERAL CONTRACTORS AND OPERATIVE BUILDERS

XI. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
SEE ATTACHMENT		

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WA7890008967

FORM 1

DANGEROUS WASTE PERMIT GENERAL INFORMATION

XI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Michael J. Lawrence — 5-19-88
Date

Michael J. Lawrence
Manager, Richland Operations
United States Department of Energy

W. M. Jacobi — 5/13/88
Date

William M. Jacobi
President
Westinghouse Hanford Company
Co-operator

9 3 1 2 7 2 1 3 7 3

Please print or type in the unshaded areas only
(areas are spaced for elite type, i.e., 12 character/inch).

3

DANGEROUS WASTE PERMIT APPLICATION

1. EPA/STATE I.D. NUMBER: W A 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (mo., day, & yr.)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

MO.	DAY	YR.
0 8		8 4

FOR EXISTING FACILITIES, PROVIDE THE DATE *(mo., day, & yr.)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

☐ 2. NEW FACILITY *(Complete item below)*

MO.	DAY	YR.

FOR NEW FACILITIES, PROVIDE THE DATE, *(mo., day, & yr)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Section I above)*

☒ 1. FACILITY HAS AN INTERIM STATUS PERMIT

☐ 2. FACILITY HAS A FINAL PERMIT

III. PROCESSES - CODES AND CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the *(Section III-C)*.

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.

1. AMOUNT - Enter the amount.

2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D80	GALLONS OR LITERS
LANDFILL	D81	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D82	*ACRES OR HECTARES*
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING SECTION III *(shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons.* The facility also has an incinerator that can burn up to 20 gallons per hour.

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
	T 0 4	150	U		7				
					8				
3					9				
4					10				

CONTINUE ON REVERSE

Continued from the front.

ROCESSES (continued)

PACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

T04

The Hanford Patrol Academy Demolition Sites (HPADS) were two adjacent demolition sites located in the 1100 Area of the Hanford Facility. These demolition sites were used to detonate explosive wastes (T04) that were generated on the Hanford Site. The treatment design capacity of the HPADS was 150 gallons (570 liters) of waste per day.

IV. DESCRIPTION OF DANGEROUS WASTES

A. DANGEROUS WASTE NUMBER - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.

B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

1. Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

EXAMPLE FOR COMPLETING SECTION IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. DANGEROUS WASTE NO. *(enter code)*	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*	D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
	D054	900	P	T03 D80	
	D002	400	P	T03 D80	
X-3	D001	100	P	T03 D80	
X-4	D002			T03 D80	*included with above*

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

MBER *(entered from page 1)*

7	8	9	0	0	0	8	9	6	7

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. *(enter code)*	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*	D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
1	D001	1000	K	T04	Treatment-Other (Demolition)
2	D002				
3	D003				
4	D018				
5	P022				
6	P048				
7	P105				
8	U108				
9	U117				
10	U133				
	U213				
12	U234				
13	WT01				
14	WT02				
15	WP01				
16	WP03				
17	WC01				
18	WC02				Included with above
19					
20					
21					
22					
23					
24					
26					

ed from the front.

SCRIPTION OF DANGEROUS WASTES (continued)

THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION D(1) ON PAGE 3.

The HPADS were used for the treatment of nonradioactive explosive, ignitable, shock-sensitive, and/or reactive discarded chemical compounds. The discarded chemical compounds treated at the HPADS all exhibited the dangerous waste characteristics of ignitability (D001) and reactivity (D003). Some of the compounds also exhibited the dangerous waste characteristic of corrosivity (D002) and may have the state-only designations for toxic extremely hazardous waste (WT01), toxic dangerous waste (WT02), persistent - halogenated hydrocarbons, extremely hazardous waste, (WP01), persistent - polycyclic aromatic hydrocarbons, extremely hazardous waste, (WP03), carcinogenic extremely hazardous waste (WC01), and/or carcinogenic dangerous waste (WC02). The Estimated Annual Quantity of Dangerous Waste (item IV.B) of 1,000 kilograms (2,204 pounds) represents the maximum total amount of waste that is believed to have been treated at the HPADS.

2 1 8 7 7

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawings and photos.

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*

VIII. FACILITY OWNER

[x] A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information. I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME *(print or type)*	SIGNATURE	DATE SIGNED
John D. Wagoner, Manager U.S. Department of Energy Richland Field Office	John D. Wagoner	11/18/92

RATOR CERTIFICATION

I under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information. I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME *(print or type)*	SIGNATURE	DATE SIGNED
SEE ATTACHMENT		

 CONTINUE ON PAGE 5

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

John D. Wagoner — 11/18/92

Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Field Office

Date

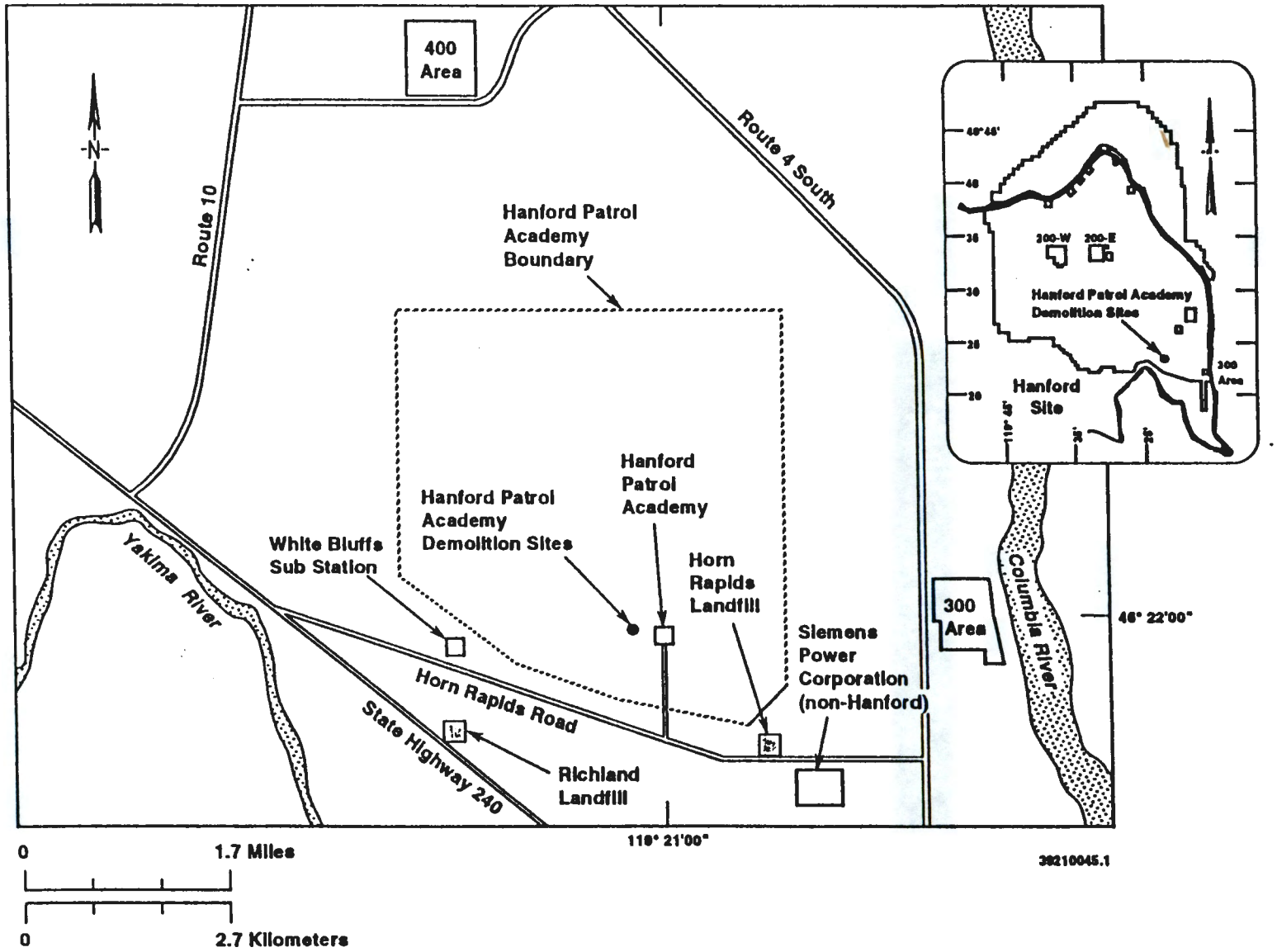
Thomas M. Anderson — 10-30-92

Co-operator
Thomas M. Anderson, President
Westinghouse Hanford Company

Date

9 3 1 2 7 2 1 3 7 8

Hanford Patrol Academy Demolition Sites



HANFORD PATROL ACADEMY DEMOLITION SITES

46°22′00"
119°21′00"

90072312-79CN
(PHOTO TAKEN 1990)

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1.0 INTRODUCTION

This chapter provides background information for the Hanford Patrol Academy Demolition Sites (HPADS) and provides an overview of the contents of the HPADS closure plan.

1.1 BACKGROUND

From 1975 to 1991 the HPADS were used for demolition events. These demolition events were a form of thermal treatment for spent or abandoned chemical waste. Because the HPADS will no longer be used for this thermal activity, the sites will be closed. Closure will be conducted pursuant to the requirements of the Washington State Department of Ecology (Ecology) *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-610 and 40 CFR 270.1. Closure also will satisfy closure requirements of WAC 173-303-680 and for the thermal treatment closure requirements of 40 CFR 265.381.

This closure plan presents a description of the HPADS, the history of the waste treated, and the approach that will be followed to close the HPADS. Because dangerous waste does not include the source, special nuclear, and by-product material components of mixed waste, radionuclides are not within the scope of WAC 173-303 or of this closure plan. The information on radionuclides is provided only for general knowledge where appropriate. Only dangerous constituents derived from HPADS operations will be addressed in this closure plan in accordance with WAC 173-303-610(2)(b)(i).

The HPADS are actually two distinct soil closure areas within the Hanford Patrol Academy training area. Specifically, the two sites are within the Known Distance rifle range (KD range or No. 5 range).

The HPADS are located within the 1100-EM-1 operable unit as designated in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1990). The soil of this operable unit will be addressed through the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980*, remedial investigation/feasibility process. Therefore, any required remedial action, with respect to contaminants not associated with the HPADS, will be deferred to the CERCLA remedial investigation/feasibility study process.

It is anticipated that the Hanford Patrol Academy and its training area (i.e., the firing range complex) will be operated throughout the cleanup and postclosure monitoring period of the Tri-Party Agreement controlled process; i.e., approximately the year 2050.

1.2 HANFORD PATROL ACADEMY DEMOLITION SITES CLOSURE PLAN CONTENTS

The HPADS closure plan consists of the following nine chapters.

- Introduction (Chapter 1.0)
- Facility Description (Chapter 2.0)
- Process Information (Chapter 3.0)
- Waste Characteristics (Chapter 4.0)
- Groundwater Monitoring (Chapter 5.0)
- Closure Performance Standards (Chapter 6.0)
- Closure Activities (Chapter 7.0)
- Postclosure Plan (Chapter 8.0)
- References (Chapter 9.0).

A brief description of each chapter is provided in the following sections.

1.2.1 Facility Description (Chapter 2.0)

This chapter provides a brief description of the Hanford Site and the location and description of the HPADS. Information on Hanford Site security also is provided.

1.2.2 Process Information (Chapter 3.0)

This chapter describes how the HPADS processed the waste and explains the overall waste treatment system.

1.2.3 Waste Characteristics (Chapter 4.0)

This chapter discusses the waste inventory and the characteristics of the waste that was treated at the HPADS.

1.2.4 Groundwater Monitoring (Chapter 5.0)

This chapter discusses the probability that groundwater contamination has not occurred and that groundwater monitoring is not needed.

1.2.5 Closure Performance Standards (Chapter 6.0)

This chapter discusses the closure strategy, performance standards for protection of health and the environment, and closure activities.

1.2.6 Closure Activities (Chapter 7.0)

This chapter discusses sampling and analysis activities for closure. A closure schedule and a certification are included.

1.2.7 Postclosure Plan (Chapter 8.0)

This chapter outlines provisions for postclosure care if required.

1.2.8 References (Chapter 9.0)

References used throughout this closure plan are listed in this chapter. All references listed here, which are not available from other sources, will be made available for review, upon request, to any regulatory agency or public commentor. References can be obtained by contacting the following:

Administrative Records Specialist
Public Access Room H4-22
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

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2-4. Known Distance Range and Closure Area Details F2-4
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2.0 FACILITY DESCRIPTION

This chapter briefly describes the Hanford Site, the Hanford Facility, and the location of the HPADS, and provides information on the Hanford Site security.

2.1 GENERAL HANFORD SITE DESCRIPTION

The Hanford Site covers approximately 560 square miles (1,450 square kilometers) of semiarid land that is owned by the U.S. Government and managed by the U.S. Department of Energy, Richland Field Office (DOE-RL). The Hanford Site is located northwest of the city of Richland, Washington (Figure 2-1). The city of Richland adjoins the southeasternmost portion of the Hanford Site boundary and is the nearest population center. In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related activities for the production and purification of special nuclear materials and other nuclear activities. The mission of the Hanford Site recently has focused on waste management and environmental remediation and restoration.

Activities on the Hanford Site are centralized in numerically designated areas. The reactors are located along the Columbia River in the 100 Areas. The reactor fuel reprocessing units are in the 200 Areas, which are on a plateau approximately 7 miles (11 kilometers) from the Columbia River. The 300 Area, located adjacent to and north of Richland, contains the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, 5 miles (8 kilometers) northwest of the 300 Area, contains the Fast Flux Test Facility used for testing liquid metal reactor systems. The 600 Area covers all locations not specifically given an area designation. Adjacent to and north of Richland, the 1100 Area contains offices associated with administration, maintenance, transportation, and materials procurement and distribution. The 3000 Area, between the 1100 Area and 300 Area, contains engineering offices and administrative offices. Administrative offices also are located in the 700 Area, which is in downtown Richland.

2.2 HANFORD FACILITY DESCRIPTION

The Hanford Facility is a single *Resource Conservation and Recovery Act of 1976* (RCRA) facility, identified by the U.S. Environmental Protection Agency (EPA)/State Identification Number WA7890008967, that consists of over 60 treatment, storage, and/or disposal (TSD) units included in the *Hanford Site Dangerous Waste Part A Permit Application* (DOE-RL 1988b). The Hanford Facility consists of the contiguous portion of the Hanford Site that contains these TSD units and, for the purposes of RCRA, is owned and operated by the U.S. Department of Energy (excluding lands north and east of the Columbia River, river islands, lands owned by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and lands owned by or leased to the state of Washington).

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2.3 DESCRIPTION OF HANFORD PATROL ACADEMY DEMOLITION SITES

The Hanford Patrol Academy is about 2 miles (3.2 kilometers) south-southwest of the 300 Area and 0.5 miles (0.8 kilometers) north of the Horn Rapids Road, which is the northern boundary of the city of Richland, Washington (Figure 2-1). The HPADS closure areas are within the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* 1100-EM-1 operable unit, not the 600 Area of the Hanford Site.

The physical character of the Hanford Patrol Academy training area, including closure areas, is generally that of slightly sloped sand dunes. Vegetation has been removed from the firing range complex, including both closure areas. This was necessary for fire prevention and safety reasons (e.g., bullet ricochets).

In the 1940s, the U.S. Army developed and used the six firing ranges that are now defined as the Hanford Patrol Academy Firing Range Complex. The DOE-RL also has allowed usage of the firing ranges by non-Hanford personnel (e.g., the city of Richland Police Department and the Richland Rod and Gun Club), but ended that practice in 1982. The two closure areas are on the KD firing range, separated by the concrete and earthen slope known as the 'target butt'. Figures 2-2 through 2-5 detail the locations of the Hanford Patrol Academy, the firing ranges, and the closure areas.

Since 1986, the firing range has been predominantly used for firearms training by the Hanford Patrol and, with the permission of the DOE-RL, the Richland Police Department and other personnel have used the range for firearms training. It is planned that the Hanford Patrol will train at the firing range complex and, in particular, the KD range will continue to be used for firearms training throughout the closure and postclosure monitoring phases of the Hanford Site's cleanup (until about year 2050). Also, it is anticipated that the KD range will continue to be available for selected Richland Police Department training purposes. Waste will no longer be detonated at the HPADS.

Structures near the closure areas include the target butt with an attached target repair shed (Appendix 2A). The KD range is a 600-yard (about 550-meter) rifle range, with known distance shooting positions at 100, 200, 300, 400, 500, and 600 yards (91, 183, 274, 366, 457, and 549 meters) (Figure 2-4). The demolitions occurred within the KD range bullet impact area. Closure Area No. 1 is immediately south of the target butt at the change in slope (invert). Closure Area No. 2 is about 180 feet (55 meters) north of the target butt (Figure 2-4). Figure 2-5 shows the locations and physical dimensions of the closure areas.

Closure Area No. 1 was used before Closure Area No. 2. Closure Area No. 1 was located by interviews with personnel who witnessed the detonations. More reliable documentation of Closure Area No. 1 is not known to exist, and the firing range has been repeatedly graded, eliminating any visible evidence of the detonations. Closure Area No. 2 was first used in late 1984, and has apparently not changed position. This pit initially was excavated by hand to

a pit approximately 10 feet (3 meters) in diameter and 1.5 feet (0.5 meters) deep, and subsequently enlarged by demolitions.

2.4 SECURITY INFORMATION

The entire Hanford Site is a controlled-access area. Access control to operational areas of the Hanford Site is expected to remain for the foreseeable future [while active institutional control is likely to continue indefinitely, for purposes of conservatism, a 100-year active institutional control period was assumed with passive controls after that time (DOE 1987)]. The Hanford Site maintains around-the-clock surveillance for the protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of armed guards to provide Hanford Site security.

Manned barricades are maintained around the clock at checkpoints on vehicular access roads leading to the operational areas of the Hanford Site. All personnel accessing these areas must have a U.S. Department of Energy-issued security identification badge indicating the appropriate authorization. Personnel also might be subject to a search of items carried into or out of these areas.

Access to the HPADS closure areas will be obtained from the Hanford Patrol Academy firing range safety officer. The closure areas have been roped off and delineated with warning signs to restrict personnel entry.

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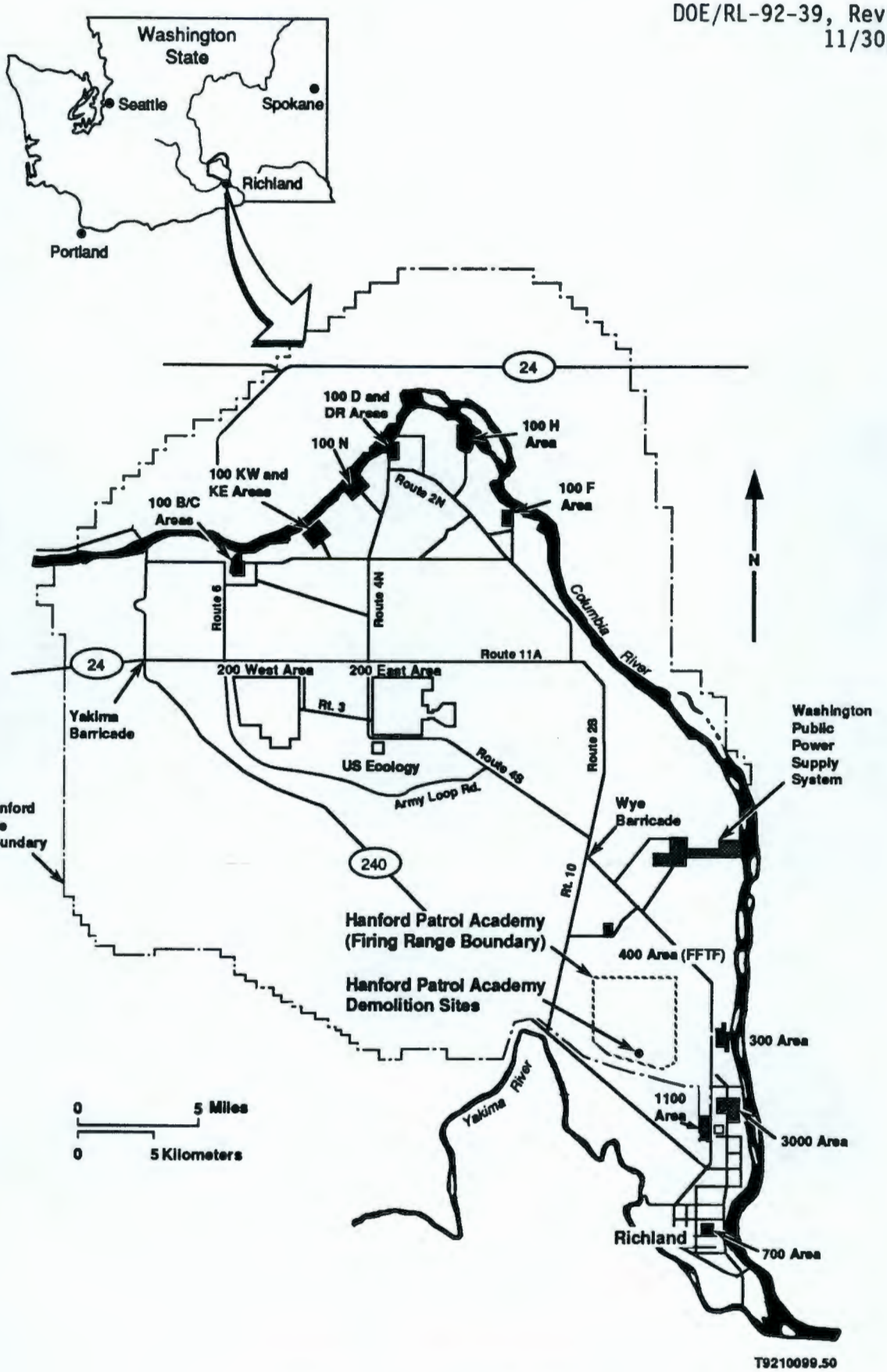

Figure 2-1. Hanford Site.

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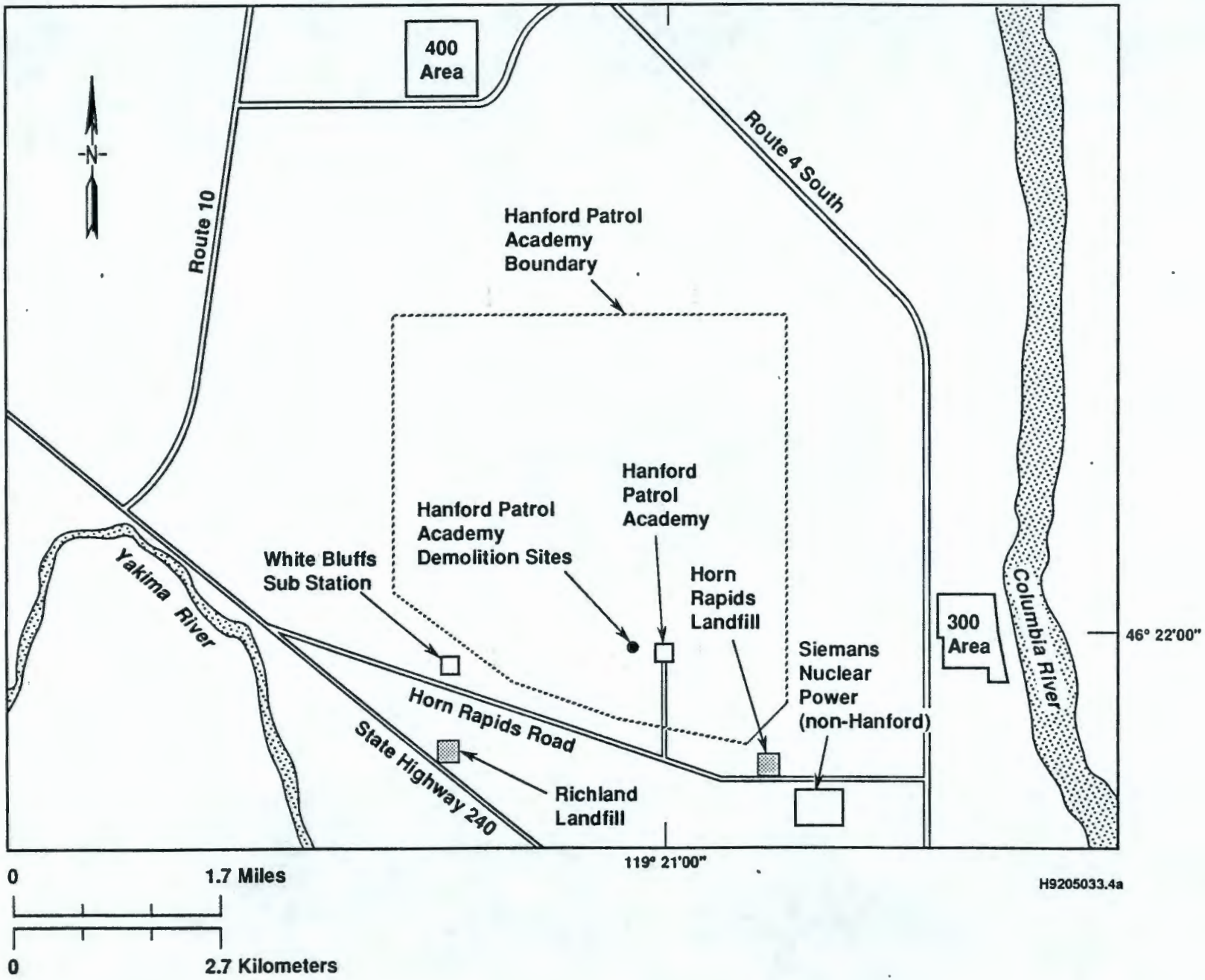

Figure 2-2. Hanford Patrol Academy Location.

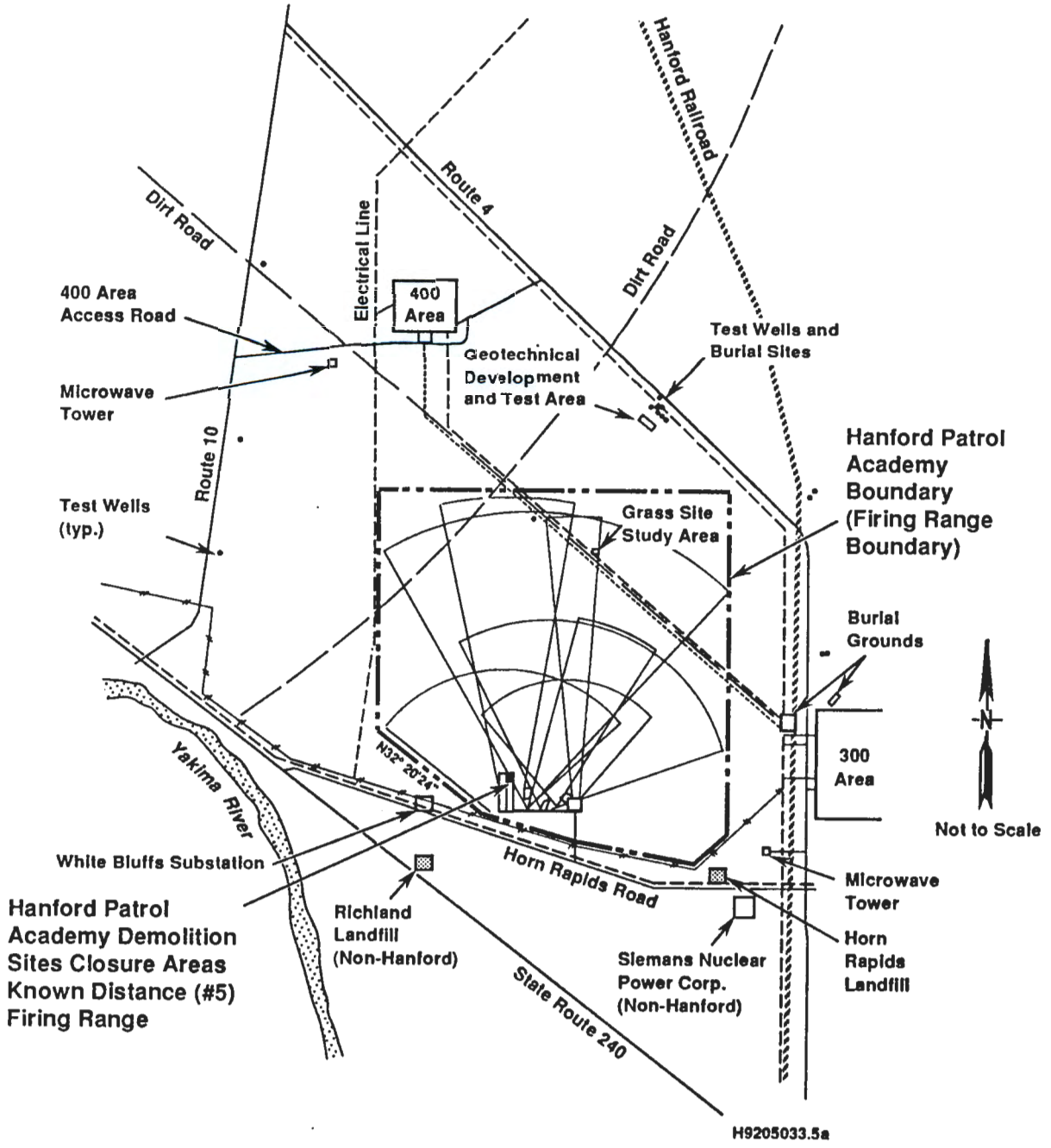

Figure 2-3. Hanford Patrol Academy Boundary.

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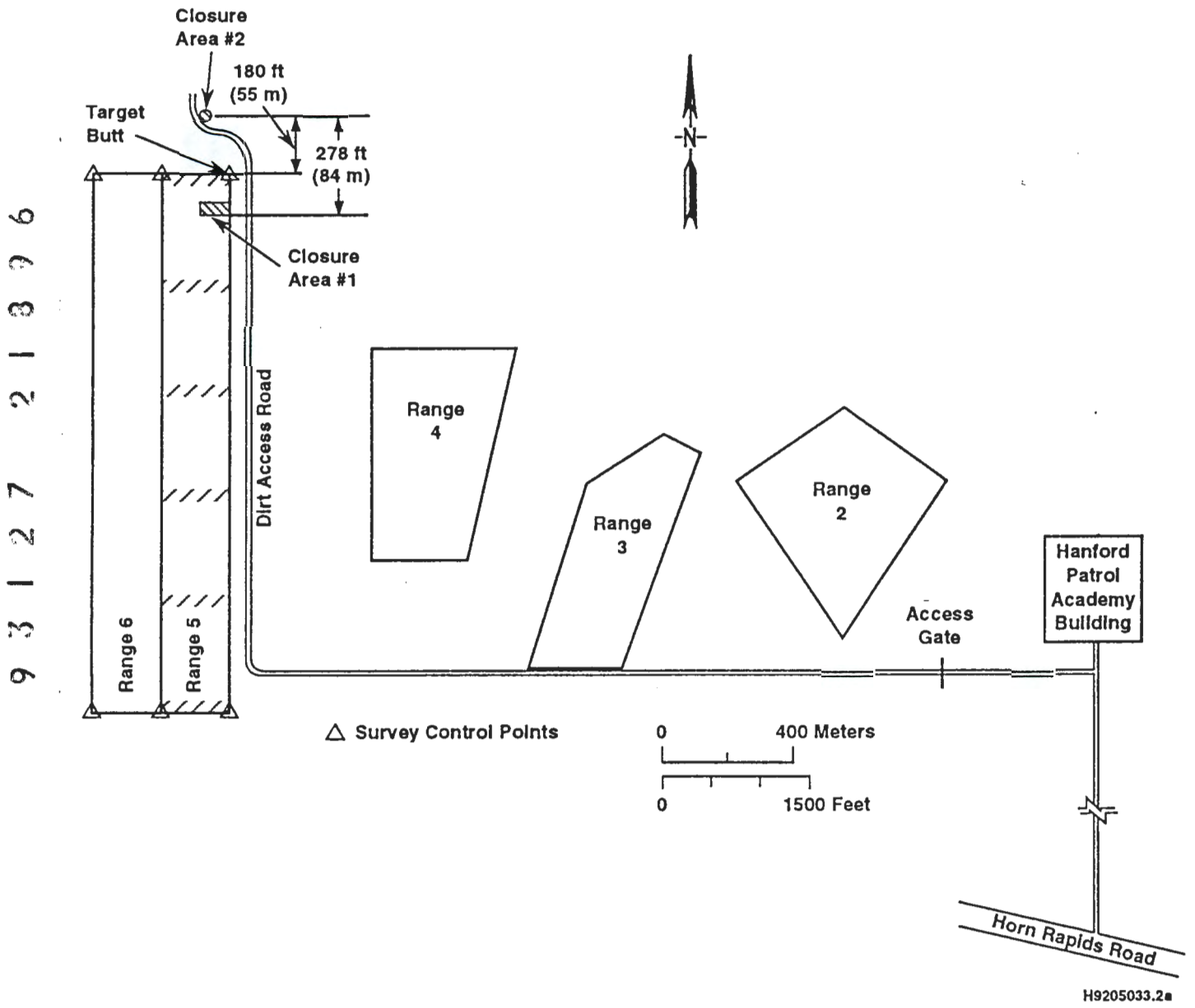

Figure 2-4. Known Distance Range and Closure Area Details.

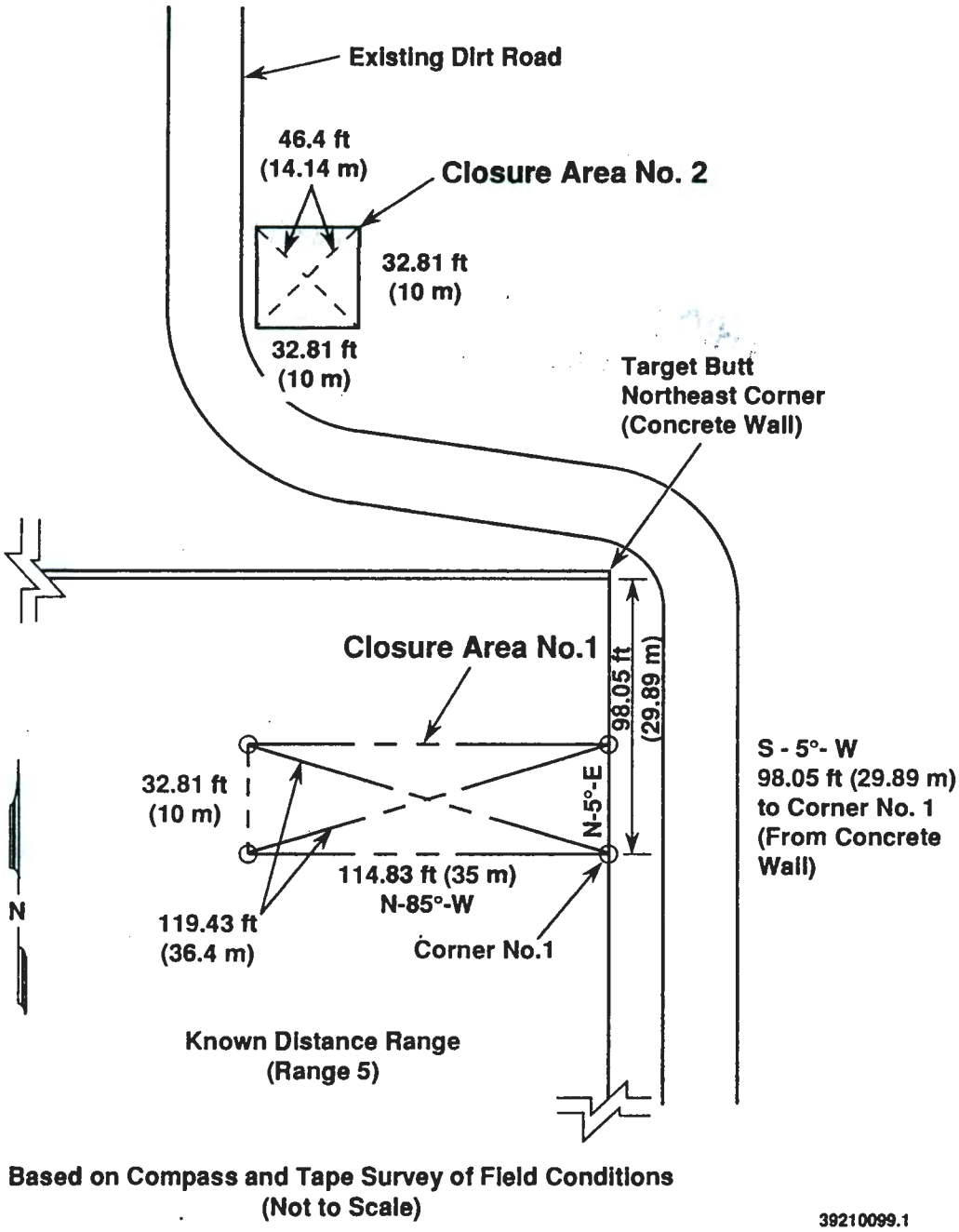

Figure 2-5. Hanford Patrol Academy Demolition Sites Closure Areas.

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3.0 PROCESS INFORMATION

This chapter describes how the waste was processed at the HPADS and the use of Closure Areas No. 1 and No. 2.

3.1 DEMOLITION PROCESS

Demolition of discarded explosive chemicals was performed at the various Hanford Patrol Academy firing ranges from 1975 (before RCRA regulations) through October 27, 1991. In 1975 discarded explosive chemicals were detonated with M14 rifle fire initiating the detonation of individual chemical containers. The containers that were to be detonated by M14 rifle fire were placed on the ground at the invert of whichever firing range target butt was used.

In October of 1984, onsite organizations started to document the removal from their inventory of any nonradioactive explosive, shock-sensitive, chemical compounds that exceeded the manufacturer's recommended shelf life. Typically, solid waste engineering organizations would coordinate the transportation and demolition events. To minimize worker safety concerns and transportation hazards, similar demolition sites were established in the 200 Areas [refer to 216-E-8 Borrow Pit Closure Plan (DOE-RL 1992a) and the Ash Pit Closure Plan (DOE-RL-1992b)].

Starting in 1984, the city of Richland Police Department Bomb Squad supplied commercial explosives and initiated the HPADS demolitions. With the use of the explosives, the designated chemical containers were transported in the city of Richland's bomb trailer. Detonations in the HPADS closure areas occurred in specially hand-excavated holes to control the demolition's air blast damage and to enhance the explosive effects.

The normal routine was to pick up the compounds in the city of Richland Police Department bomb trailer after the day shift ended and transport the compound(s) to the HPADS. Hanford Patrol and Hanford Fire Department personnel provided escort vehicles (i.e., a lead Hanford Patrol vehicle with flashing lights, the bomb trailer and its tractor, the command vehicle, a fire truck, other vehicles (if involved), and a Hanford Patrol vehicle with lights flashing). The Hanford Patrol Academy was cleared of nonessential personnel, and a safety zone was established. The demolition pit was prepared before arrival of the discarded explosive chemicals.

The usual detonation sequence was to place the containers into the pit bottom, to place the explosives above and around the containers, and 'wire-in' the explosives. Occasionally, additional detonation cord was used to wrap specific, large-sized chemical containers to ensure better explosive efficiency. After the demolition personnel cleared the blasting zone, the explosives were detonated with an electric blasting cap.

Following a detonation, onsite personnel would physically inspected the demolition pit and surveyed the closure area. Occasionally an organic vapor

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analyzer was used to determine that the discarded chemicals were consumed in the detonation. No records were kept from the post-detonation inspections. Following the post-demolition survey and before returning to Richland, the city of Richland Bomb Squad retrieved its electrical blasting line, other blasting paraphernalia, and unused explosives. The demolition event was considered complete with the release of the Hanford Patrol Academy for routine activities.

Periodically throughout the Hanford Patrol Academy Firing Range Complex, the vegetation was removed systematically to minimize potential brush fires, and for other firing range safety precautions; e.g. ricochets. This practice also occurred at both of the closure areas, and is readily observable from the photographs in Appendix 2A.

From discussions with personnel that were present during the various HPADS events and while gathering the process information (Chapter 3.0), it was stated and subsequently confirmed that in 1975 a metal canister of napalm B was used as a M14 rifle target. On this occasion, the napalm B canister failed to detonate, and after an attempt to ignite it with direct flame, the canister was buried somewhere on one of the firing ranges. It is known that a full canister contained approximately 5 pounds (2.2 kilograms) of napalm B, and was buried approximately 3-feet (1-meter) deep. The specific location of the canister is unknown. No records were kept. The U.S. Army Corps of Engineers (COE), who is conducting the CERCLA 1100-EM-1 Operable Unit remedial investigation and feasibility study, has been informed of the napalm B canister and that the COE has responsibility for the 1975 chemical waste inventory. Before 1984, no formal records were kept about demolition practices.

Interviews with former demolition personnel revealed that on another occasion a demolition failure occurred and, following surveys with the organic vapor analyzer, an ether can remnant and ether-contaminated soil were placed in several 30-gallon (113.6-liter) containers and sent to an offsite treatment, storage, and/or disposal (TSD) facility for disposal (Appendix 3A). Once a grass fire was ignited by a detonation, and immediately extinguished by the on-hand Hanford Fire Department personnel. Routinely the firing ranges and closure areas were graded (scarified) to remove vegetation to reduce the potential for fire.

3.2 DEMOLITION AREAS

The earlier demolitions occurred at the base earthen target butt of the KD range. This area is shown as Closure Area No. 1 in Chapter 2.0, Figure 2-5. In November 1984, the location was moved to behind the target butt (Closure Area No. 2) to minimize potential air blast damage to the Hanford Patrol Academy structures.

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4-2. Summary of Waste Treated at the Hanford Patrol Academy Demolition Sites T4-2

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4.0 WASTE CHARACTERISTICS

This chapter addresses the waste inventory and waste forms treated at the HPADS.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

It is believed that the total amount of chemicals treated at the HPADS (1984-1991) was approximately 570 pounds (260 kilograms) (Table 4-1). It is believed that these wastes, which consisted of nonradioactive discarded explosive chemicals, either were totally consumed during the various detonations and/or rendered harmless by natural processes. The explosive, shock-sensitive, flammable, ignitible, and/or highly-reactive properties of the chemicals were used to bring about their chemical decomposition and/or destruction during detonation. The chemicals were rendered harmless to human health and the environment by the explosion's thermal characteristics. Additionally, because of the volatility and instability of the chemicals at atmospheric conditions, if the detonations were not 100 percent successful, then the lapsed time from the last detonation would be more than adequate for the natural processes of oxidation (exposure to the atmosphere) and hydration (exposure to water) to decompose the chemicals.

4.2 WASTE FORMS AT THE HANFORD PATROL ACADEMY DEMOLITION SITES

Table 4-2 tabulates the waste designations per WAC 173-303. Information concerning the waste inventories that was detonated at the HPADS is located in Appendix 4A. Selection of chemicals for detonation generally was based on explosive, shock-sensitive, and/or flammable properties. Table 4-3 data indicate that all of the chemicals should have volatilized, that the desert environment would have volatilized any liquids that might have been absorbed by the sand dune-like soil surface, and that the solid materials would have decomposed in the desert environment. As shown in Table 4-2, the waste designations indicate that all of the waste was amenable to the explosive destruction, i.e., detonation was an effective method to beneficially exploit the waste characteristics of ignitability and reactivity.

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Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 1 of 4)

CLOSURE AREA NO. 1

Chemical	Amount (kg)	Container number/size	Detonation date	Reference
Ethyl ether	11.400	25x1 pt.	16-Aug-84	PNL-84-004
Tetrahydrofuran	5.820	6x1 qt.	16-Aug-84	PNL-84-007
Perchloric Acid	3.118	8x1 pt.	16-Aug-84	PNL-83-020
2-Butoxyethanol	3.955		16-Aug-84	PNL-83-014

CLOSURE AREA NO. 2

Chemical	Amount (kg)	Container number/size	Detonation date	Reference	Location
Ethyl Ether	0.406		Nov-84	RHO	1167
Perchloric Acid	48.180		Nov-84	RHO	1167

2,4,6-Trinitroresorcinol	0.025		30-Oct-85	PNL	3714
2,4-Dinitroresorcinol	0.070		30-Oct-85	PNL	3714
2,4 Dinitrophenol	0.500		30-Oct-85	PNL	3714
2,4-Dinitrophenylhydrazine	0.125		30-Oct-85	PNL	3714
α-Nitrosomethyl isobutyl ketone	0.174		30-Oct-85	PNL	3714
Butyl Ethanol	7.000		30-Oct-85	PNL	306E
Carbon Disulfide	9.800		30-Oct-85	PNL	332
Ethyl Ether	3.800		30-Oct-85	PNL	SIGMA 5
Glycol Dimethyl Ether	0.800		30-Oct-85	PNL	332
Hexanitrodiphenylamine	0.070		30-Oct-85	PNL	3714
Perchloric Acid	17.300		30-Oct-85	PNL	LSL 11
Picric Acid	0.100		30-Oct-85	PNL	3714
Picryl Chloride	0.300		30-Oct-85	PNL	3714
Tetrahydrofuran	49.700		30-Oct-85	PNL	SIGMA 5
Trinitrotoluene	0.100		30-Oct-85	PNL	3714
Perchloric Acid	0.190		30-Oct-85	UNC	100N
Magnesium Perchlorate	0.500		30-Oct-85	PNL	332
Tetrahydrofuran	0.480		30-Oct-85	PNL	332
Perchloric Acid	0.300		30-Oct-85	PNL	332
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Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 2 of 4)

CLOSURE AREA NO. 2

Chemical	Amount (kg)	Container number/size	Detonation date	Reference	Location
Ethyl Ether	12.000	1-gal	12-Mar-87	WHC	329
Isopropyl Ether	4.000	1-pt	12-Mar-87	PNL	331
Picric Acid	0.200	1-pt	12-Mar-87	PNL	331
Ethyl Ether	4.000	1-pt	12-Mar-87	PNL	331

Borontrifluoride Ether Complex	0.400	1	25-Aug-87	PNL 22-129	332
1,4-Dioxane	0.500	1	25-Aug-87	PNL	332
Tetrahydrofuran	0.100	1	25-Aug-87	PNL	332
Hydrazine Monohydrate	0.500	1	25-Aug-87	PNL	332
Borontrifluoride Methanol Complex	1.000	1	25-Aug-87	PNL	332
Butyllithium/Benzene Mixture (25:75)	0.200	1	25-Aug-87	PNL 22-125	332
Borontrifluoride/Methanol Mixture (14:	0.050	1	25-Aug-87	PNL	332
Borontrifluoride Ether Complex	0.100	1	25-Aug-87	PNL	332
2,4-Dinitrophyenlhydrazine	0.025	1	25-Aug-87	PNL	332
Allyl Ether (100%)	.0005	1	25-Aug-87	PNL	332
Triethyl Aluminum	0.300	1	25-Aug-87	PNL 22-114	332
Naphthacene	0.003	1	25-Aug-87	PNL	332
2-Methylfuran (100%)	.0005	1	25-Aug-87	PNL	332
Tetrahydrofuran	3.800	1	25-Aug-87	PNL 22-125	331
1,4 Dioxane	1.000	1	25-Aug-87	PNL	331

Perchloric Acid	0.140		09-Dec-87	UNC	100N
Magnesium Perchlorate	0.500		09-Dec-87	PNL	332
Tetrahydrofuran	0.480		09-Dec-87	PNL	332
Perchloric Acid	0.300		09-Dec-87	PNL	332
Trinitrololuene	0.100		09-Dec-87	PNL	3714
Picric Acid	0.200		09-Dec-87	PNL	3714

1,4 Dioxane	2.590		21-Jun-88	WHC	100N
Ethyl Ether	2.140		21-Jun-88	PNL	332

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Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 3 of 4)

CLOSURE AREA NO. 2

Chemical	Amount (kg)	Container number/size	Detonation date	Reference	Location
Perchloric Acid	0.125		21-Jun-88	PNL	332
Ethyl Ether	0.250		21-Jun-88	PNL	332
Picryl Chloride	0.080		21-Jun-88	PNL	332
Picric Acid	0.620		21-Jun-88	PNL	332
Lithium Triethylborohydride	0.900		20-Dec-88	PNL-24-556	332
Ethyl Ether	1.500		20-Dec-88	PNL-24-737	332
Ethyl Ether	10.800		20-Dec-88	PNL	332
2,2',4,4',6,6'-Hexanitrodi-phenylamine	0.050		20-Dec-88	PNL	332
Picryl Chloride	0.025		20-Dec-88	PNL-24-764	332
1,4-Dioxane	0.500		20-Dec-88	PNL-24-764	332

2,4-Dinitrophyenlhydrazine	0.113		10-Feb-89	NONE	331

Tetrahydrofuran	1.000		02-Mar-89	PNL-24-878	332
Hydrazine Monohydrate	0.800		02-Mar-89	PNL-25-054	332
2,4-Dinitrophyenthydrazine	0.200		02-Mar-89	PNL-25-114	331
Perchloric Acid	7.000		02-Mar-89	PNL-25-114	331
Ethyl Ether, anhydrous	1.000		02-Mar-89	PNL-25-114	331
Benzoyl Peroxide	0.450		02-Mar-89	PNL-25-114	331
Tetrahydrofuran	7.600		02-Mar-89	PNL-25-114	331
1,4-dioxane	3.000		02-Mar-89	PNL-25-114	331
2,4,6,2',6-Hexanitrodi-phenylamine	0.200		02-Mar-89	PNL-25-114	331

Picryl Chloride	0.060	1-4 oz	26-Apr-89	PNL-25-209	332
1,4 Dioxane	5.450	11-pt.	26-Apr-89	PNL-25-209	332
p-Dioxane	1.000	1-1/2 gal	26-Apr-89	PNL-25-209	332
Tetrahydrofuran	3.800	1-gal	26-Apr-89	PNL-25-209	332
Nitrocellulose/Isopropyl Alcohol	2.000	2-pt	26-Apr-89	PNL-25-209	332
n-Butyl Ether	0.500	1-qt	26-Apr-89	PNL-25-209	332

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Table 4-1. Dangerous Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 4 of 4)

CLOSURE AREA NO. 2

Chemical	Amount (kg)	Container number/size	Detonation date	Reference	Location
Dibutyl Tetra Ethylene Glycol	2.000	1-2 l	26-Apr-89	PNL-25-209	332
2-Methoxyethyl ether	1.000	1-l	26-Apr-89	PNL-25-209	332
1,3,5-Trinitrobenzene	0.050	1-50 g	26-Apr-89	PNL-25-209	332
1,4 Diethoxybutane	0.500	1-pt	26-Apr-89	PNL-25-209	332
2-Ethoxybytanone	0.100	1-100 g	26-Apr-89	PNL-25-209	332
Dimethoxypropane	0.025	1-25 g	26-Apr-89	PNL-25-209	332
Di-tert-butyl-ether	0.025	1-25 g	26-Apr-89	PNL-25-209	332
2,4,6-Trintro-m-toluene	0.100	1-100 g	26-Apr-89	PNL-25-209	332
Hexanitrodiphenylamine	0.025	1-100 g	26-Apr-89	PNL-25-209	332
Ammonium Perchlorate	0.450	1-500 g	26-Apr-89	PNL-25-210	332
Benzoyl Peroxide	0.100	1-100 g	26-Apr-89	PNL-25-210	332
Hydrazine Monohydrate	2.000	3-500 g	26-Apr-89	PNL-25-210	332
Tetrahydrofuran	4.000	1-gal	26-Apr-89	PNL-25-210	332
Sodium-Potassium Alloy (NaK)	0.500	5-gal	26-Apr-89	WHC-25-134	3718-F
Sodium Azide	0.100	1-100 g	19-Jul-89	WHC-252-82	2101M/208
1,3,5 - Trinitrobenzene	0.050	1	06-Jun-90	PNL	300 AREA
Lithium Aluminum Hydride	1.000	1	06-Jun-90	PNL	300 AREA
Hydroxylamine Hydrochloride	0.250	1	27-Oct-91	10948	T-Plant

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Table 4-2. Summary of Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 1 of 2)

Chemical identification	Quantity (kg)	Complete waste designation (40 CFR 261, WAC 173-303)
Closure Area No. 1		
2-Butoxyethanol	3.955	D001, D003, WT02
Ethyl ether	11.400	D001, D003, U117, WT02
Perchloric acid	3.118	D001, D002, D003, WT02
Tetrahydrofuran	5.820	D001, D003, U213, WT02
Subtotal	24.293	
Closure Area No. 2		
Allyl ether	0.0005	D001, D003, WT01
Ammonium perchlorate	0.450	D001, D003, WT02
Benzoyl peroxide	0.550	D001, D003
Boron trifluoride ether complex	0.500	D001, D002, D003, WP01
Boron trifluoride methanol cmpb	1.050	D001, D002, D003, WP01, WT02
Butyl ethanol; syn. 2-hexanol	7.000	D001, D003
n-butyl ether	0.525	D001, D003, WT02
Butyllithium/benzene mix. (25:7	0.200	D001, D003, D018, WC02, WT01
Carbon disulfide	9.800	D001, D002, P002, WT02
Dibutyl tetraethylene glycol	2.000	D001, D003
1,4-Diethoxybutane	0.500	D001, D003
2,2-Dimethoxypropane	0.025	D001, D003
2,4-Dinitrophenol	0.500	D001, D003, P048, WT02
2,4-Dinitrophenylhydrazine	0.463	D001, D003
2,4-Dinitroresorcinol	0.070	D001, D003
1,4,-Dioxane; syn. p-Dioxane	14.040	D001, D003, U108, WC01, WT02
2-Ethoxybutanone	0.100	D001, D003
(Ethylene) Glycol dimethyl ether	0.800	D001, D003
Ethyl ether	35.896	D001, D003, U117, WT02
Hexanitrodiphenylamine	0.345	D001, D003

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Table 4-2. Summary of Waste Treated at the Hanford Patrol Academy Demolition Sites. (sheet 2 of 2)

	Chemical identification	Quantity (kg)	Complete waste designation (40 CFR 261, WAC 173-303)
1	Hydrazine monohydrate	3.300	D001, D002, D003, U133, WC01
2	Hydroxylamine hydrochloride	0.250	D001, D003
3	Isopropyl ether	4.000	D001, D003, WT02
4	Lithium aluminum hydride	1.000	D001, D002, D003
5	Lithium triethylborohydride	0.900	D001, D002, D003
6	Magnesium perchlorate	1.000	D001, D003
7	2-Methoxyethyl ether	1.000	D001, D003
8	2-Methylfuran	0.0005	D001, D003, WT01
9	Napthacene	0.003	
10	Nitrocellulose/isopropyl alcohol	<2	D001, D003
11	A-Nitrosomethyl isobutyl ketone	0.174	D001, D003
12	Perchloric acid	73.535	D001, D002, D003, WT02
13	Picric acid	1.120	D001, D002, D003
14	Picryl chloride	0.465	D001, D003
15	Sodium azide	0.100	D001, D002, P105, WT02
16	Sodium-potassium alloy (NaK)	0.500	D001, D002, D003
17	Tetrahydrofuran	70.960	D001, D003, U213, WT02
18	Triethylaluminum in toluene	0.300	D001, D003
19	1,3,5-Trinitrobenzene	0.100	D001, D003, U234, WT02
20	2,4,6-Trinitroresorcinol	0.025	D001, D003
21	2,4,6-Trinitrotoluene	0.300	D001, D003, WT02
22	Subtotal	235.847	
23			
24	Total waste treated	260.14	
25			

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CONTENTS

5.0 GROUNDWATER MONITORING 5-1

APPENDIX

5A GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES . . . . . APP 5A-i

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5.0 GROUNDWATER MONITORING

Based on knowledge of the demolitions conducted at the HPADS, and on limited but pertinent groundwater information, it is considered extremely unlikely that the demolition site chemicals interacted with groundwater because (1) rainfall at the Hanford Site is slight, thus limiting contaminant migration, and (2) it is believed that all significant quantities of chemicals were destroyed in the explosion or volatilized to the atmosphere.

A characterization of groundwater quality and geohydrologic conditions in the vicinity of HPADS is presented in Appendix 5A. Groundwater wells that monitor the uppermost unconfined aquifer exist at two locations near the HPADS. At one of the locations, a well also monitors the uppermost confined aquifer. These wells were constructed before RCRA standards, and are not optimally located to monitor flow underneath the HPADS. Groundwater at the wells currently is monitored as part of the Hanford Sitewide environmental surveillance program conducted by Pacific Northwest Laboratory under U.S. Department of Energy Order 5400.1.

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FIGURE

6-1. Closure Strategy Flowchart F6-1

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter describes the closure strategy, closure performance standards, and closure activities.

6.1 CLOSURE STRATEGY

Clean closure is the proposed closure strategy (Figure 6-1). Chemical analyses of soil samples will be used to confirm closure. All other materials (buildings) were purposely kept beyond the potential influence of the demolition events. Therefore, only the soil media will be tested to determine closure. Ground-penetrating radar will be used to ascertain that the buried napalm B canister (Chapter 3.0) is not within the closure areas.

The boundary for each closure area has been determined by the combined judgment of personnel that were present during the demolition events. Based on visits to the KD range, these 'demolitions personnel' collectively have located the closure areas (Chapter 2.0, Figure 2-4). The final closure area boundaries will be confirmed by the results of regulatory acceptable soil sampling and analyses.

Based on the (possibly 1984) M14/single canister detonations and limited pit detonations, Closure Area No. 1 is the eastern 115 feet (35 meters) of the south side of the KD range target butt, with the centerline at the break in the slope between the mound of the target butt and the flat ground in front of the target butt; and extending 16.4 feet (5 meters) laterally (north and south) from the centerline. As shown in Chapter 2.0, Figure 2-4, Closure Area No. 2 is about 246 feet (75 meters) north of Closure Area No. 1 and 180 feet (55 meters) north of the target butt's concrete wall. As shown in the photographs in Appendix 2A, the existing detonation pit is about 10 feet (3 meters) in diameter. Closure Area No. 2 was physically monumented (located) before December 1989 [Page 6 of Addendum 1 to *Hanford Patrol Firing Range Safety Assessment Document* (WHC 1989b)] with 4 steel fence posts and wire that support closure area signs. Likewise, Closure Area No. 1 is roped off and access restriction signs are in use. The photographs in Appendix 2A predominately show Closure Area No. 2. The maximum soil depth for both of the closure areas will be 3 feet (1 meter).

In addition to the ground-penetrating radar survey and soil sampling (Chapter 7.0), a series of field screening surveys might be performed. Field screening might be performed with an organic vapor meter, an x-ray fluorescence unit, and ground-penetrating radar equivalent systems.

The acceptable exposure levels for soil values are subject to changes in the IRIS database information and other studies that extrapolate animal information to derive human health threshold values. Soil cleanup action levels will be developed from Hanford Site background threshold values (DOE-RL 1992d), *Characterization and Use of Soil and Groundwater Background for the Hanford Site* (WHC 1991a), the MTCA-based acceptable exposure level information (DOE-RL 1992c), and/or EPA soil cleanup guidance.

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Action levels are concentrations of analytes of concern that prompt an action, such as soil removal and/or treatment, or further evaluation. Initial action levels will be the greater of two levels: background or limit of quantitation. Background values will be Site-wide background threshold values as defined in *Hanford Site Soil Background* (DOE-RL 1992d). The limit of quantitation is the level above which quantitative analysis can be obtained with a specific degree of confidence (generally the mean background signal plus 10 standard deviations). If concentrations exceed initial action levels, health-based action levels will be assessed.

The health-based levels will be based on equations and exposure assumptions presented in the *Hanford Site Baseline Risk Assessment Methodology* (DOE-RL 1992c). For non-carcinogens, the principal variable relating human health to action levels is the oral reference dose, and it is defined as the level of daily human exposure at or below which not adverse effect is expected to occur during a lifetime. For carcinogens, the cancer slope factor is the basis for determining human health effects; it is a measurement of risk per unit dose. The oral reference dose and cancer slope factor are chemical specific and are obtained from the IRIS database (EPA 1989). Health-based levels will be based on values that are current at the time of approval of this plan.

It is proposed that as the (1992-2050) land-use is designated (e.g., industrial), the corresponding soil action levels would be protective of the ecosystem in the particular setting.

As an alternate closure strategy, if the field screening and/or soil sampling results reveal any significant contamination resulting from the demolition events, soil cleanup values will be used to make decisions about protecting human health and the environment. This alternate closure strategy could be reevaluated and the sampling plan could be modified (e.g., phase II) to include limited soil removal and/or removal of chemical container debris, and/or monitoring until the CERCLA 1100-EM-1 operable unit Record of Decision is made.

6.2 CLOSURE PERFORMANCE STANDARDS

The closure performance standards in WAC 173-303-610(2) require the owner or operator to close the TSD unit in a manner that:

> "(a)(i) Minimizes the need for further maintenance;
>
> (ii) Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, postclosure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, ground water, or the atmosphere; and
>
> (iii) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity."

6.2.1 Minimize the Need for Future Maintenance

The closure performance standard in WAC 173-303-610(2)(a)(i) requires the owner or operator of a TSD unit to close the site in a manner that minimizes the need for further maintenance. As discussed in Section 6.1, the strategy proposed for closure (i.e., that the site is clean by demonstration that the contaminants are below action levels or waste removal) will minimize the need for future maintenance.

6.2.2 Protect Human Health and the Environment

The HPADS is to be closed. Consistent with this intent and strategy, the following actions will be/or have been taken (as necessary) in advance of closure certification.

- The closure areas will be surveyed with ground-penetrating radar to confirm the absence of the buried (1975) napalm B container.
- Surface soils will be sampled for dangerous waste constituents.
- If necessary, contaminated soil will be removed to reduce constituent concentrations in site surface soils to acceptable soil cleanup values as determined by methods prescribed in WAC 173-340 and implemented by the *Hanford Site Baseline Risk Assessment Methodology* (DOE-RL 1992c).

6.2.3 Return Land to the Appearance and Use of Surrounding Land

In accordance with WAC 173-303-610(2)(a)(iii), the owner or operator of a TSD unit is required to close the unit in a manner that returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

When closed, the HPADS closure areas will be returned to the Hanford Patrol Academy. The Hanford Patrol Academy training activities are expected to continue to about the year 2050.

At this time, the U.S. Department of Energy has taken no formal position regarding post-Hanford Site long-term (after year 2050) land uses with the 1100 Area, nor has the U.S. Department of Energy advanced any specific architectural vision regarding the appearance of the land surface in the 1100 Area subsequent to final restoration. These issues will be addressed as aspects of developing a comprehensive after-Hanford land use plan.

The Hanford Patrol Academy is located within the 1100-EM-1 operable unit. The proposed mode of closure for the HPADS is clean closure. No specific closure activities are proposed for the demolition sites that would involve reconfiguration of the surface of the sites (i.e., only minor regrading or revegetation). In the present condition, the demolition sites conform to the use and appearance of surrounding land.

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6.3 CLOSURE ACTIVITIES

The general closure activities are as follows. The details of the closure activities are provided in Chapter 7.0.

- Ground-penetrating radar survey.

- Collect soil samples from within the closure areas and from surrounding soils. Sample locations and collection methods are discussed in Chapter 7.0, Section 7.2.3, Sampling Methodology.

- Analyze samples in accordance with EPA-approved procedures and evaluate analysis results. Samples will be analyzed in an onsite mobile laboratory capable of performing to EPA Analytical level III standards.

- Compare analysis results to action levels to determine the extent of contamination to determine the presence or absence of contaminants or to facilitate decisions concerning remediation.

- If contamination levels for all constituents of concern listed in Chapter 7.0, Table 7-1, are below the action level, the HPADS will be closed.

- If contamination at the HPADS is above the action level in the near-surface soils, one of the following actions will be taken. (The action level for the HPADS is when contamination is above both background concentrations and health-based standards.)

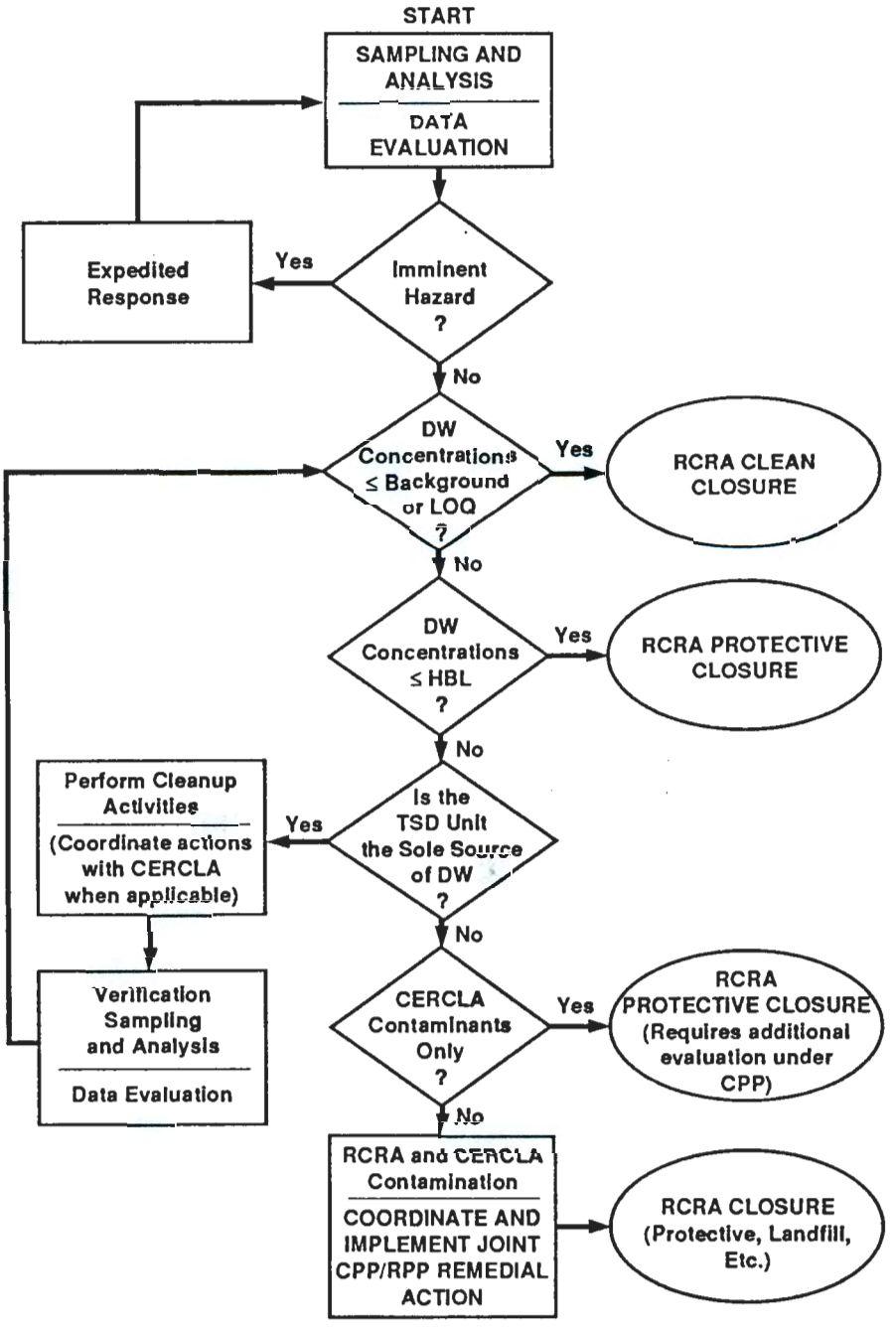
  - If the contamination is from HPADS activities only, soil will be treated and/or disposed of in a RCRA-compliant landfill.

  - If the soil is contaminated with dangerous waste constituents from other sources in addition to HPADS activities, the soil will be remediated in coordination with CERCLA activities.

  - If the soil is contaminated from sources other than HPADS activities, the site will no longer be a RCRA site, and remediation will occur under CERCLA as part of 1100-EM-1 operable unit.

All equipment used in performing closure activities will be decontaminated or disposed of at a RCRA-compliant facility.

Closure activities will be monitored by an independent registered professional engineer who will certify that closure activities are accomplished in accordance with the specifications of the approved closure plan. The certification will be sent by registered mail or an equivalent delivery service.



Background = Hanford Site-wide background threshold (upper limit of the range of concentrations) for soil (DOE-RL 1992d).
Clean Closure = Closure based on the criterion that dangerous waste is not present in concentrations greater than background or LOQ; no further remedial action to be taken.
CPP/RPP = CERCLA past practice/RCRA past practice.
DW = Dangerous waste as defined in WAC 173-303.
HBL = Health-based levels.
LOQ = Limit of quantitation; the level above which quantitative analysis can be obtained with a specified degree of confidence; generally $10\sigma \pm 3\sigma$.
Protective Closure = Closure based on the criterion that dangerous waste concentrations are less than or equal to HBL; no further remedial action to be taken.
Verification Sampling = Sampling and analysis used to evaluate the success of contamination removal.

Figure 6-1. Closure Strategy Flowchart.

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7.0 CLOSURE ACTIVITIES

This chapter describes the proposed closure activities for the HPADS. In conformance with Chapter 6.0, this chapter provides the specific field sampling and laboratory analytical procedures that will be applied to identify the soil contamination (if any) that originated at the HPADS. When validated, the analytical results will be used to determine the appropriate closure strategy (presented in Chapter 6.0 and illustrated in Figure 6-1). The sampling and analysis plan (Section 7.2) has been developed from the process information (Chapter 3.0), waste inventory (Chapter 4.0), and the closure strategy (Chapter 6.0). Appendix 7A contains the quality assurance project plan for soil sampling and analysis.

7.1 GROUND-PENETRATING RADAR SURVEY

In ground-penetrating radar surveys, variations in electromagnetic (radar) fields in the ground are used as a means of locating buried natural or manmade features, objects, or materials. The ground-penetrating radar method is based on propagating pulsed-electromagnetic waves into the ground, and evaluating distortions in the returning waves caused by backscattering from subsurface objects or interfaces. Performance of ground-penetrating radar surveys is described in Environmental Investigation Instructions (EII) 11.2, "Geophysical Survey Work, Appendix A: Ground-Penetrating Radar" (WHC 1988a). This EII provides descriptions of the equipment used, calibration, maintenance, and data collection procedures, and data interpretation.

As discussed in Chapter 3.0, in 1975 a canister of napalm B might have been buried in either of the HPADS closure areas. A ground-penetrating radar survey will be performed to check the two closure areas to confirm that the canister (or other objects of similar size) is not present in the shallow subsurface of either area. Any subsurface anomalies identified during the survey that could be interpreted as a canister, container, or other metal object will be investigated by excavation. If the subject canister is discovered, the canister will be removed, together with any associated napalm B-contaminated soil, and disposed of in an appropriate manner.

At Closure Areas No. 1 and No. 2, stake lines will be laid out on 5-foot (1.5-meter) centers to support equipment layout, data collection, and survey documentation. The ground-penetrating radar equipment will be drawn along the rows defined by the lines of the stakes. This spacing should be adequate to detect a buried metal object the size of the subject canister. A report of the survey results will be prepared and the report will be made available for regulatory review (as part of the sampling results).

7.2 SOIL SAMPLING AND ANALYSIS

Soil samples will be collected to assess whether dangerous waste constituents are present in surface soils at the two HPADS closure areas and will be analyzed at an onsite mobile analytical laboratory. If the onsite

mobile laboratory is not available, analytical level III services will be procured from another laboratory. If contaminants are present at levels in excess of proposed action levels, the data obtained from soil sampling and analysis (possibly supplemented by data obtained with portable field screening instrumentation) will provide adequate information for devising and implementing appropriate remedial action.

7.2.1 Sampling and Data Quality Objectives

To create a suitable soil sampling and analysis scheme, it is necessary to have a general understanding of explosives and detonations. An explosive is a chemical or a mixture of chemicals that is capable of producing an explosion (i.e., detonation) through the liberation of stored energy. All explosive substances produce heat; nearly all of them produce gas (Davis 1943). Explosives are classified into low explosives (or propellants), primary explosives (or initiators), and high explosives. Low explosives are combustible materials, which always include an oxidizer component, such that combustion is supportable whether or not air is present. Low explosives (themselves) burn but do not explode. Rapid accumulation of the gas products of combustion in a confined space is the actual cause of the explosion. With primary and high explosives, the materials themselves actually undergo an instantaneous chemical transformation when detonation is initiated, which liberates large quantities of heat or heat and gas, thus producing an explosion. Detonation is distinct from combustion. By themselves, many primary and highly explosives will not support combustion. Primary explosives are sensitive to both heat and shock. High explosives generally exhibit sensitivity to shock only, and generally must receive a relatively strong shock, as from a primary explosive, to detonate. Primary and high explosives are characterized by a property termed brisance, referring to the production of a shock wave during detonation, due to the characteristically high propagation velocities involved.

Chemicals that were identified as candidates for demolition at the HPADS included strong oxidizers and reducing agents (i.e., low explosives when combined), chemicals such as ethers and furans that are highly flammable and form shock-sensitive degradation products, and chemical compounds that were recognized as primary or high explosives or chemical cognates of such explosives. Before October 1984, HPADS demolition of individual canisters was initiated by rifle fire. For most demolition events after 1984, the assembled collection of chemical containers was wrapped with detonating cord (a primary explosive), surrounded by a blasting agent (propellant) and/or a high explosive (dynamite), and initiated electrically. In each multiple-chemical demolition event, detonation was typically accompanied by a distinct fireball (indicative of combustion).

The HPADS demolition events could be characterized as follows.

- Initiation by a primary explosive, resulting in propagation of a shock wave through the mass of chemical containers. The shock wave would have caused any other primary or high explosive chemicals present to detonate.

- Nonexplosive chemicals would be dispersed (in the case of solids) or atomized (in the case of liquids), directed upward (the only unconfined direction) by the partial confinement of the shallow pit, and ignited by the heat released by the explosion, causing the fireball. The explosion also could have had the effect of ionizing (fragmenting) some of the chemicals that were present.

- The shock wave from the explosion and the expanding gases from the fireball would have caused unreacted residues (if any) to be dispersed over an unspecified area.

Some chemical residues can remain in the surface soil for many years. However, in the intervening time since the most recent demolition event (i.e., October 27, 1991), volatile organic residues in the soil might have been lost to the atmosphere by vaporization. Unreacted volatiles and semivolatiles also might have been eliminated from the soil column, all or in part, by microbial activity.

The primary objective of soil sampling will be to determine whether dangerous waste contaminants are present in surface soils at the HPADS at levels exceeding the proposed action levels. Potential contaminants (i.e., analytes of interest) for sample analysis can be distinguished based on the waste inventory constituent list for the HPADS. Analytical methods are required that provide the capabilities to identify and quantitate these constituents if the constituents are present in the soil.

If dangerous waste constituents are present at or above proposed action levels, a second objective of sampling will be to determine the extent and areal distribution of contamination. The efficiency of thermal destruction during the demolition events is not directly assessable at this late date. Any chemical constituents that were not effectively destroyed in the explosion might simply have been dispersed across the detonation site. Recognizing this possibility, the sampling scheme has been designed to obtain data that will, if necessary, support an assessment regarding the adequacy of existing HPADS closure area dimensions.

It is generally acknowledged that detonation and thermal destruction are very efficient processes, and that any dangerous waste constituents that might remain in the soil at either closure area probably would exist at very low concentrations, such that detection might be difficult. Therefore, a sufficiently conservative EPA analytical support level (level III) will be invoked during initial sampling and analysis to minimize concerns that dangerous waste concentrations above the proposed action levels could go undetected. Followup sampling (as needed) might be carried out with portable field screening instruments (level I or II) to determine the areal extent and distribution of any contamination when, and if, it is determined that a reduced level of analytical support is justifiable and consistent with the overall data quality objectives of the project.

Data quality objectives are developed to describe the overall level of uncertainty in environmental data that decision-makers are willing to accept. Typically, data quality requirements are specified in terms of objectives for

precision, accuracy, representativeness, comparability, and completeness. Project-specific data quality objectives for HPADS soil sampling activities are identified in Section 7A.3 of the quality assurance project plan (Appendix 7A).

7.2.2 Analytical Parameters

As shown in Chapter 4.0, Tables 4.1 through 4.3, the demolition events at the HPADS closure areas included a variety of organic and inorganic constituents that were (or were suspected to be) characteristic reactive and/or ignitable waste (as defined in WAC 173-303-090). The majority of the chemical compounds were of two general types: (1) organic chemicals that form unstable degradation products (e.g., ethers and furans that produce shock-sensitive peroxides) and (2) reactive powdered metals and metal salts.

Analytes of interest for initial soil sampling are listed in Tables 7-1 and 7-2, together with proposed analytical methods for quantitation. The organic constituents include two compounds on the target compound list (TCL). For TCL compounds, gas chromatograph/mass spectrometer devices are calibrated to perform both identification and quantification functions. Other volatile and semivolatile organics can be identified, but the gas chromatograph/mass spectrometer system lacks the calibration information to perform quantitation. These other compounds are referred to as 'tentatively identified compounds' (TICs). Quantitative analyses for TICs can be performed with the gas chromatograph/mass spectrometer. However, the system must be calibrated separately for each TIC analyte of interest. To do so requires either onsite preparation or acquisition from a commercial supplier of individual calibration standards for each TIC.

Direct quantitation will be performed for the TCL compounds. For the listed TIC constituents, the following analytical strategy is proposed. Initially, samples will be analyzed qualitatively by gas chromatograph/mass spectrometer and by separate gas chromatograph units with multiple detectors that provide enhanced sensitivity for various classes of organics. If qualitative analyses indicate that one or more TICs are present in detectable concentrations, calibration standards will be prepared or procured to facilitate quantification of these compounds. Depending on the number of TICs identified, calibration standards may be acquired for all TICs identified or for a selected subset (if the identified number is large).

One TIC (dioxane) listed in Table 7-2 is difficult to quantify by purge and trap-gas chromatograph/mass spectrometer because dioxane exhibits poor purging characteristics in the apparatus. For this constituent, purge and trap-gas chromatograph/mass spectrometer will be used for qualitative analysis only. If detected, quantification for dioxane will be carried out by an alternative technique, such as SW-846 Method 8015 (EPA 1990).

Polar (i.e., water soluble) organic analytes of interest will be analyzed by aqueous extraction from soil followed by direct aqueous injection into a gas chromatograph with multiple detectors. To prepare for quantitative

analysis, it will be necessary to procure calibration standard solutions containing the analytes of interest.

A number of the waste inventory constituents identified in Chapter 4.0, Table 4-3, are not identified as analytes of interest in Tables 7-1 and 7-2. The rationale for modifications and deletions to the analyte lists is as follows.

- Benzoyl peroxide and butyllithium are unstable in the presence of moisture or moist air (Merck 1989, p. 174; Sax and Lewis 1987, p. 134 and p. 188; Aldrich 1986, p. 143 and p. 251). Benzoic acid and n-butanol are the expected degradation products. The degradation products are identified as the corresponding analytes of interest in Table 7-2.

- Several other inventory constituents would have reacted immediately on contact with any available oxygen and/or moisture in the air or the soil. Such constituents would include hydrazine monohydrate (Merck 1989, p. 754; Aldrich 1986, p. 737), 2,4-dinitrophenyl hydrazine (Merck 1989, p. 518; Sax and Lewis 1987, p. 422; Aldrich 1986, p. 567), lithium aluminum hydride (Sax and Lewis 1987, p. 707; Aldrich 1986, p. 823), lithium triethylborohydride (Aldrich 1986, p. 827 and p. 1214), sodium potassium alloy (NaK) (Sax and Lewis 1987, p. 805; Aldrich 1986, p. 1197), and triethyl aluminum (Sax and Lewis 1987, p. 1180; Aldrich 1986, p. 1299). Hydrazine monohydrate and 2,4-dinitrophenyl hydrazine are strong reducing agents and would be destroyed in the presence of oxygen. Lithium aluminum hydride, lithium triethylborohydride, sodium potassium alloy (NaK), and triethyl aluminum are strong reducing agents that are pyrophoric and reactive with water. It is feasible that these compounds could persist in soils in unreacted form. The reaction products, Na^+, Li^+, K^+, Al^{3+}, and OH^- ions, are environmentally benign in trace quantities. Boric oxide dust suspended in air may represent a respiratory hazard (TLV = 10 mg/m^3) (Sax and Lewis 1987, p. 162). However, boric oxide in soil appears to pose no specific environmental concern. Boric oxide is not a listed waste in WAC 173-303-9905.

- Sodium azide and hydroxylamine hydrochloride are thermodynamically unstable compounds (Merck 1989, p. 1357 and p. 766; Sax and Lewis 1987, p. 1053 and p. 623; Aldrich 1986, p. 1188 and p. 754). The decomposition products, Na^+ and NO_3^- for sodium azide and NH^{4+} and OH^- for hydroxylamine hydrochloride, are environmentally benign.

- Perchloric acid, magnesium perchlorate, and ammonium perchlorate are all strong, shock-sensitive oxidizing agents that will ignite violently in the presence of combustible substances (Merck 1989, pp. 87, 893, and 1134; Sax and Lewis 1987, pp. 69, 722, and 886). It is highly unlikely that unreacted perchlorates would be present in soil following a detonation event. In trace concentrations, any unreacted residues in soil would be environmentally benign.

- Boron trifluoride is a gas at standard temperature and pressure (Merck 1989, p. 206; Sax and Lewis 1987, p. 164), and therefore would not be expected to be present as a residue in soils.

Of the listed analytes, nitrocellulose presents particular detection and/or quantitation problems. Extraction for analysis in the onsite mobile laboratory should not be difficult. Supercritical fluid extraction is a particularly effective technique for extracting semivolatile explosive compounds from soil. However, cellulose is a naturally occurring polymer, and like other polymer compounds, can exhibit a highly degree of variability in molecular weight. Nitration (i.e., chemical addition of nitro groups) of cellulose also can be variable with regard to the stoichiometry of the final product. Because nitrocellulose is not a single compound, it could be difficult to evaluate by gas chromatograph and gas chromatograph/mass spectrometer methods. In view of these issues, it is proposed that the other listed semivolatile organic compounds in Table 7-2 be used as indicator parameters for nitrocellulose if analysis for nitrocellulose by the indicated method is not feasible.

7.2.3 Soil Sampling Methodology

The following sections discuss sample locations, background samples, and analytical instrumentation and procedures.

7.2.3.1 Sample Locations. Soil samples will be taken, as a minimum, from the locations indicated in Figures 7-1 and 7-2. The minimum numbers and types of samples to be collected and submitted for analysis per EII procedures will consist of the following.

Closure Area No. 1:

- Eleven samples will be collected from predetermined random locations within the closure area boundary. A random number algorithm was used to select these locations.

- Surface samples will be collected from two of the 11 random locations.

- Two samples will be split in the field, placed in separate containers, and submitted as duplicates for quality assurance and quality control.

- Three blanks, consisting of an equipment blank, a field blank, and a trip blank, will be collected and submitted for analysis with the soil samples and splits. Blanks will consist of pure silica sand.

Closure Area No. 2:

- One authoritative sample will be collected at the closure area/pit center.

- Five samples will be collected from predetermined random locations within the closure area boundaries. A random number algorithm was used to select these locations.

- Surface samples will be collected from two of the five sample locations within the closure area boundaries.

- Five samples will be collected from locations outside the closure area boundaries. These locations also were selected with the aid of a random number algorithm.

- Two samples will be split in the field, placed in separate containers, and submitted as duplicates for quality assurance and quality control purposes.

- Three blanks, consisting of an equipment blank, a field blank, and a trip blank, will be collected and submitted for analysis with the soil samples and splits. Blanks will consist of pure silica sand.

Soil samples will be removed from the specified locations for qualitative and quantitative analyses in an onsite mobile laboratory. Sampling will be performed in conformance with EII 5.2 - Appendix E (WHC 1988a). Samples will be collected manually using decontaminated hand tools at each closure area. Typically, at each location to be sampled, the uppermost 6 inches (15 centimeters) of soil will be pushed aside. Samples will be taken from the interval 6 to 18 inches (15 to 46 centimeters) below grade. Chemical residues from the demolition events would have been deposited on the surface of the soil column. Over time, the soluble constituents would have undergone gradual removal by successive wetting fronts (from rainfall and snowmelt events), and redeposited lower in the soil profile. With the proposed sampling approach, leachable or otherwise mobile constituents that might have been reduced to concentrations below detection limits at the soil surface still could be detected below grade. If volatile organics remain in the soil at the closure areas, the volatile organics will be more readily detectable at shallow depths below the soil surface, rather than at the surface itself. Two additional samples will be collected from the 0- to 6-inch (0- to 15-centimeter) interval at the locations shown in Figures 7-1 and 7-2 to verify that contaminants do not persist as immobile or insoluble residues at the soil surface.

Soil samples (including blanks and duplicates) will receive preassigned sample numbers in conformance with EII 5.10, "Obtaining Sample Identification Numbers and Accessing HEIS Data" (WHC 1988a). The sample volume required for each soil sample will be 2 pounds (1.0 kilogram) [4 pounds (2.0 kilograms) for samples that will be split]. The samples will be chilled on ice per EII procedures. Samples will be stored temporarily and transported in an ice chest. Recommended holding time limits for samples are listed by analyte/analytical method in Tables 7-1 and 7-2.

7.2.3.2 Background Samples. A Hanford Site-wide assessment of natural constituent background levels has been performed (WHC 1991a; WHC 1991b). The majority of dangerous waste constituents detonated at the HPADS closure areas were organic chemicals, for which background values will be assumed to be

negligibly small. For these constituents, concentration data will be compared to respective laboratory quantitation limits, rather than background. A few compounds on the waste inventory (e.g., picryl chloride) contained inorganic metal and/or halide elements. Residues from these compounds could include oxides, metal cations, and/or various anions with non-zero background values. Results from the Hanford Site-wide assessment will be available for use in data interpretation. No independent assessment of local background values is planned to support closure. The adequacy of available Hanford Site-wide background data for HPADS site-specific contaminants will be evaluated in conjunction with the interpretation of soil sample analytical results. Additional soil sampling to evaluate local background could be performed if necessary.

7.2.4 Analytical Instrumentation and Procedures

The onsite mobile laboratory will be equipped with the following principal analytical instrumentation:

- Gas chromatograph (GC) - configured for multiple detectors as follows:

  - Photoionization detector (PID) - screening for aromatics, unsaturated aliphatic compounds, chlorinated solvents

  - Flame ionization detector (FID) - screening for volatile organic compounds

  - Electron capture detector (ECD) - screening for halogenated compounds, pesticides, polynuclear aromatic hydrocarbons, and other semivolatiles

- Gas chromatograph/mass spectrometer (GC/MS) - quantitative analyses of volatile, semivolatile and nonvolatile organic compounds. The gas chromatograph/mass spectrometer analyses will be supported by the following concentration/extraction systems:

  - Purge and trap unit - extraction of volatile organic compounds

  - Supercritical fluid extraction (SFE) unit - extraction of semivolatile and nonvolatile organics

- X-Ray fluorescence (XRF) spectrometer - screening and quantitative analyses for metals.

- Ion chromatograph (IC) - quantitative analyses for cations and anions.

The onsite mobile laboratory gas chromatograph unit is specifically configured for operation of multiple detectors (i.e., photoionization detector, flame ionization detector, and electron capture detector) in series. This series configuration will be used to screen for organics in advance of quantitative analysis by gas chromatograph/mass spectrometer. Specified method detection limits for the photoionization detector, flame ionization

detector, and electron capture detector units are 100 micrograms per kilogram (parts per billion) (soil). Procedures for calibration, standardization, and maintenance of the gas chromatograph photoionization detector, flame ionization detector, and electron capture detector system will be based on onsite mobile laboratory procedures, and published EPA methods.

Procedures for calibration, standardization, and maintenance of the gas chromatograph/mass spectrometer system and associated extraction systems will be based on the following published methods:

For volatile organics:

- SW-846 Method 5030--Sample preparation by the purge and trap method
- SW-846 Method 8240--Volatile organic compounds by gas chromatograph/mass spectrometer: packed column technique
- SW-846 Method 8260--Volatile organic compounds by gas chromatograph/mass spectrometer: capillary technique

For semivolatile organics:

- SW-846 Method 8250--Semivolatile organic compounds by gas chromatograph/mass spectrometer: packed column technique
- SW-846 Method 8270--Semivolatile organic compounds by gas chromatograph/mass spectrometer: capillary technique.

The EPA has not formally approved a supercritical fluid extraction procedure for gas chromatograph/mass spectrometer determinations. A draft method currently is under review (EPA 1991). Procedures for the onsite mobile laboratory will be based on procedural guidance from the instrument manufacturer. The specified method detection limit for the gas chromatograph/mass spectrometer system for volatiles is 10 micrograms per liter.

The x-ray fluorescence technique is a rapid-turnaround, nondestructive test method for metals (specifically, metals with atomic numbers greater than 11). The onsite mobile laboratory x-ray fluorescence system configuration will include vacuum pump, power source, soil grinder, sample preparation materials, and metal standards. The onsite mobile laboratory procedure will reference Method FM-2 (EPA 1988). Specified detection limits for target metals specifically regulated under the National Pollution Discharge Elimination System, RCRA, and the *Clean Water Act of 1977* will be 20 micrograms per gram.

Onsite mobile laboratory analyses for Na^+, NH_4^+, K^+, Mg^{++}, Ca^{++}, Cr^{+6}, NO_3^-, NO_2^-, Cl^-, F^-, Br^-, SO_4^{--}, HPO_4^{--}, and CN^- will be performed by ion chromatography methods. Specified detection limits for CN^- and Cr^{+6} are 10 micrograms per liter. Specified detection limits for other listed ions are 20 micrograms per milliliter. Ion chromatographic analyses will be performed according to EPA Method 300.0 for anions (excluding CN^-), Method 300.7 for

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cations (excluding Cr^{+6}), Method 218.6 for Cr^{+6}, and Method 353.2 for nitrogen, NO_3^- and NO_2^- (EPA 1979). There currently is no EPA approved method for CN^- by ion chromatography. Determinations for CN^- will follow the recommended method from the ion chromatography system manufacturer.

The onsite mobile laboratory will be equipped with auxiliary instrumentation for determining sample mass, pH, electrical conductivity, and CO_2/CO_3 content.

7.2.5 Quality Assurance and Quality Control

This section summarizes the quality assurance and quality control components and procedures that will be imposed on the onsite mobile laboratory operation and the documentation that will be generated along with the analytical data to ensure that the data will be acceptable.

The objective of the onsite mobile laboratory procurement is to provide onsite, quick-turnaround screening capabilities for samples of contaminated media equivalent to analytical level III. To ensure that the basic character of analytical expedience of the mobile laboratory will not be compromised, analytical quality assurance and quality control will be limited to procedures and protocols that are appropriate for production of analytical level III data.

The following quality assurance requirements will be imposed on all analytical work performed by the mobile laboratory.

- **Duplicate samples**: Duplicate samples will be included for analysis with each batch of samples. In this context, a batch of samples refers to a group of samples collected during one sampling event by a single method. Duplicate samples will be placed in separate containers and assigned separate numbers in the field (for field quality assurance purposes) or will be prepared in the laboratory by dividing (splitting) an individual sample (for laboratory quality control purposes).

- **Method check samples**: A check sample will be analyzed with each batch of samples. The check sample will contain a representative subset of the constituents to be determined by each prescribed analytical method. Check samples will be prepared with constituent concentrations approaching the limit of quantification as a means of continuously monitoring the accuracy and precision of the various analytical methods.

- **Column check standards**: Each batch of adsorbents used in chromatographic analysis will be checked for constituent recovery by running the elution pattern with standards as a column check. The elution pattern will be optimized for maximum recovery of constituents and maximum rejection of contaminants.

- **Instrument calibration**: Analytical instrumentation will be maintained in tuned, aligned, and/or calibrated condition consistent with applicable requirements specified in the onsite mobile laboratory's analytical procedures and/or calibration schedules. Calibration records will be maintained for all onsite mobile laboratory measurement and test equipment.

- **Reagent blanks**: A reagent blank will be carried through each analytical procedure with each batch of samples.

- **Additional quality assurance and quality control requirements for gas chromatograph/mass spectrometer analyses**: Instrument calibration status will be checked once each operating day or at the beginning of each 12-hour period of operation. Calibration will be verified by comparing the response at specified frequencies against a standard curve. For use in determinations of volatile organics, gas chromatograph/mass spectrometer response will be checked with 4-bromofluorobenzene. For semivolatiles, decafluorotriphenylphosphine will be used as the check standard. If the instrument response is out of specification for any ion species identified in the ion abundance criteria in the analytical procedure, the instrument will be recalibrated and rechecked before any additional analyses are performed.

- **Additional quality assurance and quality control requirements for x-ray fluorescence analyses**: Additional quality assurance and quality control will be required for x-ray fluorescence analyses because of the nature of the technique and the small mass of sample used to perform the analysis. Frequent analyses of duplicate samples are necessary to monitor both sample homogeneity and analytical precision. At least one duplicate sample will be analyzed per 20 samples or per sample lot, whichever is greater. Precision will be evaluated by computing the relative percent difference (RPD) between the results from duplicate samples x_1 and x_2. The RPD is computed as follows:

$$\text{RPD} = 100 \bullet \frac{|x_1 - x_2|}{\bar{x}}$$

where $\bar{x}$ is the mean of x_1 and x_2. Acceptance criteria for RPD will be defined in operating procedures for quality control purposes. If results for a given element fall outside this limit, the data will be flagged and x-ray fluorescence analyses suspended until the problem has been diagnosed and corrected. Diagnostic steps will include analyzing additional splits or duplicates to evaluate sample homogeneity and rerunning calibration standards to evaluate the performance of the x-ray fluorescence relative to specifications. Calibration standards will include National Institute of Standards and Technology reference metals specimens and check standards containing a mixture of metal constituents.

- **Additional quality assurance and quality control requirements for ion chromatography analyses:** Additional quality assurance and quality control requirements for ion chromatography analysis are prescribed in EPA/600/4-79/020 "Methods for Chemical Analysis of Water and Wastes", Methods 300.0 (anions), 300.7 (cations), 353.2 (nitrogen, NO_3/NO_2), and 218.6 (Cr^{+6}) (EPA 1979). These requirements will be incorporated (directly or by reference) into onsite mobile laboratory analytical procedures.

To provide objective verification of the analytical quality of the onsite mobile laboratory operation, the laboratory will be enrolled in and periodically evaluated by the Proficiency Environmental Testing program, administered by the Analytical Products Group, a subsidiary of Curtin Matheson Scientific, Incorporated, 2730 Washington Boulevard, Belpre, Ohio 45714. The Proficiency Environmental Testing program distributes standards (i.e., spike samples) bimonthly to participating laboratories for analysis. Standards are provided for gas chromatograph analyses for volatile and semivolatile organics, x-ray fluorescence metals, and ions analyzed by ion chromatography. The Analytical Products Group collates and evaluates the results reported by all of the laboratories. The quality assurance officer for each laboratory receives a report of findings, including the true values of constituents in the standards, the individual laboratory's percent recovery, the means and standard deviations for all participating laboratories, and the individual laboratory's deviation from the mean for each standard.

7.2.6 Field Documentation

The field team leader will maintain a logbook during soil sampling and ground-penetrating radar surveying activities, in accordance with EII 1.5, "Field Logbooks" (WHC 1988a). Information pertinent to ongoing activities at the closure areas will be recorded in a legible manner with indelible ink in the logbook.

7.2.7 Evaluation of Data

Data reliability will be evaluated through a review of field documentation, sample handling procedures, analytical procedures, onsite mobile laboratory documentation, and calibration records. The purpose of the review will be to establish the reliability of the data by verifying that: (1) samples were labeled, handled, and controlled in a manner designed to minimize the possibility of physical misidentification, (2) instrumentation was maintained in calibration for the duration of the activity, and (3) analysis and calibration records are in complete and retrievable condition. Procedures for quality control documentation will follow SW-846, Chapter 1, "Quality Assurance" (EPA 1990).

7.2.8 Statistical Evaluation

Analytical results will be reviewed and summarized. Procedures for calculating detection and quantitation limits of constituents and for reporting of data will follow the guidance in EPA SW-846, Chapter 1, "Quality Assurance" (EPA 1990) and *Characterization and Use of Soil and Groundwater Background for the Hanford Site* (WHC 1991a). Constituents will be eliminated from further consideration in cases where all results are below detection limits (provided the detection limit is below background). For the remaining constituents, data will be tabulated for statistical evaluation. Summary statistics will be computed. The following information for individual constituents will be summarized for presentation:

- Total number of values
- Number of values less than detection limits
- Minimum value
- Maximum value
- Mean
- Median
- Standard deviation
- Coefficient of variation.

Data analysis and evaluation procedures will be used that: (1) balance the false positive and false negative error rates; (2) are appropriate for the distribution of sample data for each analyte; and (3) are consistent with the nature of the data (e.g., the proportion of 'non-detects' in the data sets) and the applicable regulatory limits (background values or risk-based standards). Appropriate statistical methods might include (but would not be limited to) tests on means, percentiles, and/or proportions.

7.2.9 Determination of Proposed Action Levels

Action levels will be proposed for all contaminants of concern. Contaminant levels will be compared against proposed action levels to assess the need for remedial action. If a determination is made that some remedial action will be necessary as a condition of closure, a remedial action plan will be prepared. Soil cleanup action levels will be developed from Hanford Site background threshold values, MTCA-based acceptable exposure level information (WAC 173-340), and/or EPA soil cleanup guidance.

7.3 REMOVAL OF CONTAMINATED SOIL

If soil sampling results and assessments of remedial options should indicate that soil removal might be necessary to close the HPADS, this section of the closure plan will be implemented as indicated in Figure 6-1. This section describes the following activities relating to soil removal:

- Estimating the volume of contaminated soil to be removed
- Soil removal survey control

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- Soil removal operations
- Verification sampling.

7.3.1 Estimating the Volume of Contaminated Soil to be Removed

The volume of contaminated soil will be determined based on soil sampling results (i.e., the indicated constituents and their respective concentrations and distributions) and the constituent-specific proposed action levels (i.e., soil cleanup values). The volume of contaminated soil will be calculated in the following manner.

- Soil sample information will be plotted on a closure area plan drawing.

- A random sampling scheme has been proposed for initial soil sampling (Section 7.2.4). Supplemental sampling with portable field screening instrumentation might be carried out to better define the areal extent of contamination. Because contaminant concentration data typically are nonuniform, and random sampling schemes typically lead to unequal areas of influence around individual sample locations, it normally is necessary to apply some type of weighted-area technique to determine the volume of contaminated soil from the sample information. One common weighing technique involves construction of a 'Thiessen network' (Linsley and Franzini 1964). A Thiessen network is developed on a map by connecting adjacent sample locations by straight lines and erecting perpendicular bisectors to each connecting line. The polygon defined by the perpendicular bisectors around a sample location encloses an area that is everywhere closer to that sample location than to any other.

- Polygons containing elevated levels of contaminants relative to proposed action levels will be identified as contaminated areas. The vertical extent of contaminated soil within each contaminated area will be taken as 2 feet (0.6 meter) (conservatism added). For each contaminated area, the volume of soil to be removed will be determined as the product of the 2-foot (0.6-meter) depth and affected surface area. The total volume of contaminated soil will be computed as the sum of the volumes of the individual contaminated polygons and any 'surrounded' polygons.

7.3.2 Soil Removal Survey Control

Corner stakes have been installed at each closure area boundary to provide survey control for ground-penetrating radar surveys and soil sampling. Corner monuments will be installed to serve as control points (semipermanent reference points with known horizontal and vertical coordinates) for any soil removal excavation work. If removal of contaminated soil at either closure area is necessary for closure, additional survey control will be provided as needed to effectively manage and document the excavation work. The additional survey work could include a survey controlled drawing that shows the soil

sampling locations and areal extent of the contamination. A grid will be projected over the area to be excavated, and depending on the size and shape of the excavation area, grade stakes will be used (as appropriate) to control the excavation work. The controlled drawing will be modified routinely to show the extent of soil removal and the final closure area surface configuration. Afterwards, the survey control maps will be used to construct a final drawing and to assist in location control and documentation for closure verification sampling.

7.3.3 Soil Removal Operations

If necessary and if the contaminated soil volume is sufficient, it is envisioned that the soil removal operation will be performed using standard types of earth moving equipment (e.g., grader, front-end loader, backhoe, rear dump trucks, and water tanker truck). Excavation will be performed with either a backhoe or a front-end loader. If needed, to minimize dust generation and potential releases of contaminants, a water truck could apply water periodically to the excavation area and adjacent affected areas. Dust control activities will be repeated as necessary to maintain the soil in a damp (but not saturated) condition sufficient to minimize or eliminate dust production.

If the contaminated soil volume is small, 55-gallon (208-liter) containers will be used. Alternatively, soil could be bulk loaded into rear dump trucks. Trucks will be loaded in a conservative manner (with adequate space remaining below the top of the dump box) to ensure that spillage and/or unnecessary contamination of equipment surfaces does not occur. During truck loading and transportation, standard precautions will be taken to prevent airborne dispersal of materials from moving vehicles and/or the spread of contaminants by spilling or dripping of contaminated solids and/or liquids. A bed liner (or a truck with a continuous one-piece bed) will be used to prevent leakage. After a truck is loaded, the contaminated soil will be maintained in a damp condition and the load will be covered to prevent airborne contamination during transportation. The amount of moisture in the soil will be monitored to minimize or prevent the accumulation of free liquids in the truck bed.

Contaminated soil (containerized or bulk loaded) will be transported to a permitted (or interim status) disposal facility. An EPA hazardous waste manifest would be prepared to document each offsite shipment of contaminated soil as required in WAC 173-303-180 and 40 CFR 262. Contaminated soil will be prepared for shipment (i.e., labeled, marked, and placarded) as required in WAC 173-303-190. This section of the WAC incorporates by reference the applicable federal regulations on hazardous waste shipments (49 CFR 172, 173, 178, and 179).

If soil removal is necessary, the affected area will be recontoured with surrounding soils. After excavation and before recontouring of the removal areas, the affected area will undergo verification sampling (Chapter 6.0, Figure 6-1). Actual surface elevations will be checked against firing range design elevations and calculations to ensure that the firing range can fulfill

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its intended purpose. A final revision of the controlled closure area map will be prepared to show the 'as built' configuration of the firing range.

As appropriate, the destination of any removed soil will be identified within the HPADS Administrative Record. This identification will be undertaken concurrently with the closure certification (Section 7.7). All removed waste will be managed and disposed of in accordance with Ecology regulations.

7.3.4 Verification Sampling

Verification sampling will be performed following soil removal to establish that residual concentrations of the designated constituents are below action levels (i.e., the objective of soil removal has been attained). Verification samples will be taken from the newly exposed surface area resulting from soil removal. It is envisioned that a simple random design approach would be used to select sample locations. The number of samples to be taken will depend on the extent of soil removal activities. Verification samples will be analyzed in an onsite mobile laboratory. The scope of sample analysis will be limited to quantifying the residual concentrations of designated constituents of concern to compare these concentration values to the cleanup standards. Before verification sampling, the number and location of the samples and the constituents for analysis will be submitted for regulatory concurrence. It is envisioned that verification samples would be analyzed by the same procedures identified in Section 7.2.2.

7.4 PERSONNEL TRAINING

Appendix 7B contains a brief description of the training courses. Training for soil sampling personnel is covered within the EIIs. All personnel entering the TSD unit during closure must have 40 hours of hazardous waste training (Appendix 7B). Before performing actual closure activities, specific work plans will be submitted to the lead regulatory agency for review. These documents will detail the specific work activities and will not be written until the latest technology and specific materials and equipment are known.

7.5 SCHEDULE FOR CLOSURE

Closure of the HPADS will begin on notification by Ecology of plan approval. Closure will proceed according to the schedule presented in Figure 7-3.

Official copies of the closure plan will be located at the following office:

U.S. Department of Energy,
Richland Field Office
Federal Building
825 Jadwin Avenue
P.O. Box 550
Richland, Washington 99352.

The DOE-RL office will be responsible for amending this closure plan, as deemed necessary, according to the amendment procedures in WAC 173-303-610. The closure plan will be kept at the DOE-RL office until closure is complete and certified.

7.6 AMENDMENT OF CLOSURE PLAN

The closure plan for the HPADS will be amended whenever changes in operating plans or unit design affect the closure plan; whenever there is a change in the expected year of closure; or if, when conducting closure activities, unexpected events require a modification of the closure plan. The closure plan will be modified in accordance with WAC 173-303-610. This plan may be amended any time before certification of final closure of the HPADS.

If an amendment to the approved closure plan is required, the DOE-RL will submit a written request to the lead regulatory agency to authorize a change to the approved plan. The written request will include a copy of the closure plan amendment for approval.

7.7 CERTIFICATION OF CLOSURE AND SURVEY PLAT

Within 60 days of closure of the HPADS, the DOE-RL will submit to the Benton County Auditor and the lead regulatory agency a certification of closure and a duly certified survey plat. The certification of closure will be signed by both the DOE-RL and a registered independent professional engineer, stating that the unit has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail or an equivalent delivery service. Documentation supporting the independent registered professional engineer's certification will be supplied upon request of the regulatory authority.

The DOE-RL and the independent professional engineer will certify with a document similar to Figure 7-4.

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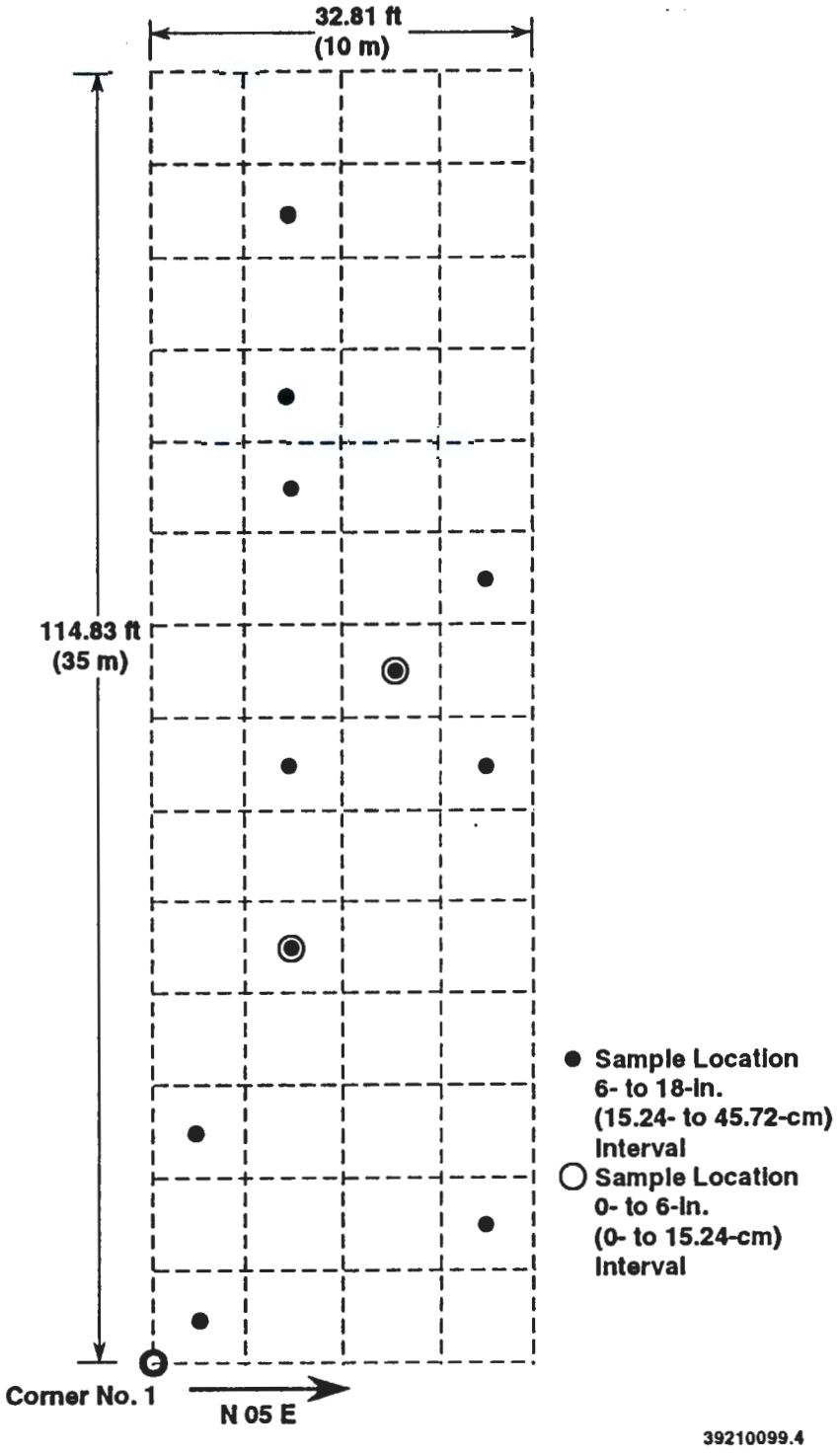

Figure 7-1. Soil Sample Locations for Hanford Patrol Demolition Site Closure Area No. 1.

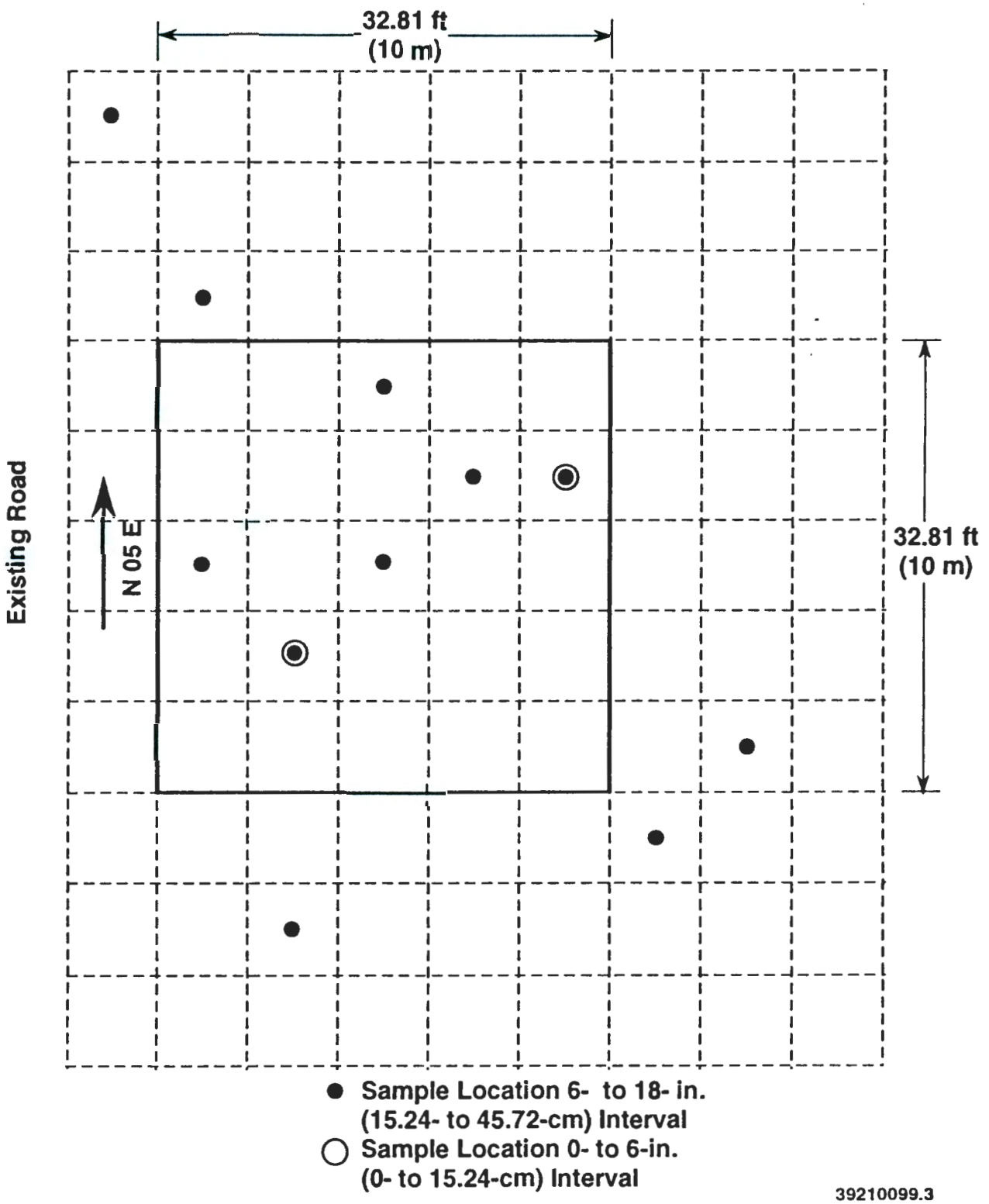

Figure 7-2. Soil Sample Locations for Hanford Patrol Demolition Site Closure Area No. 2.

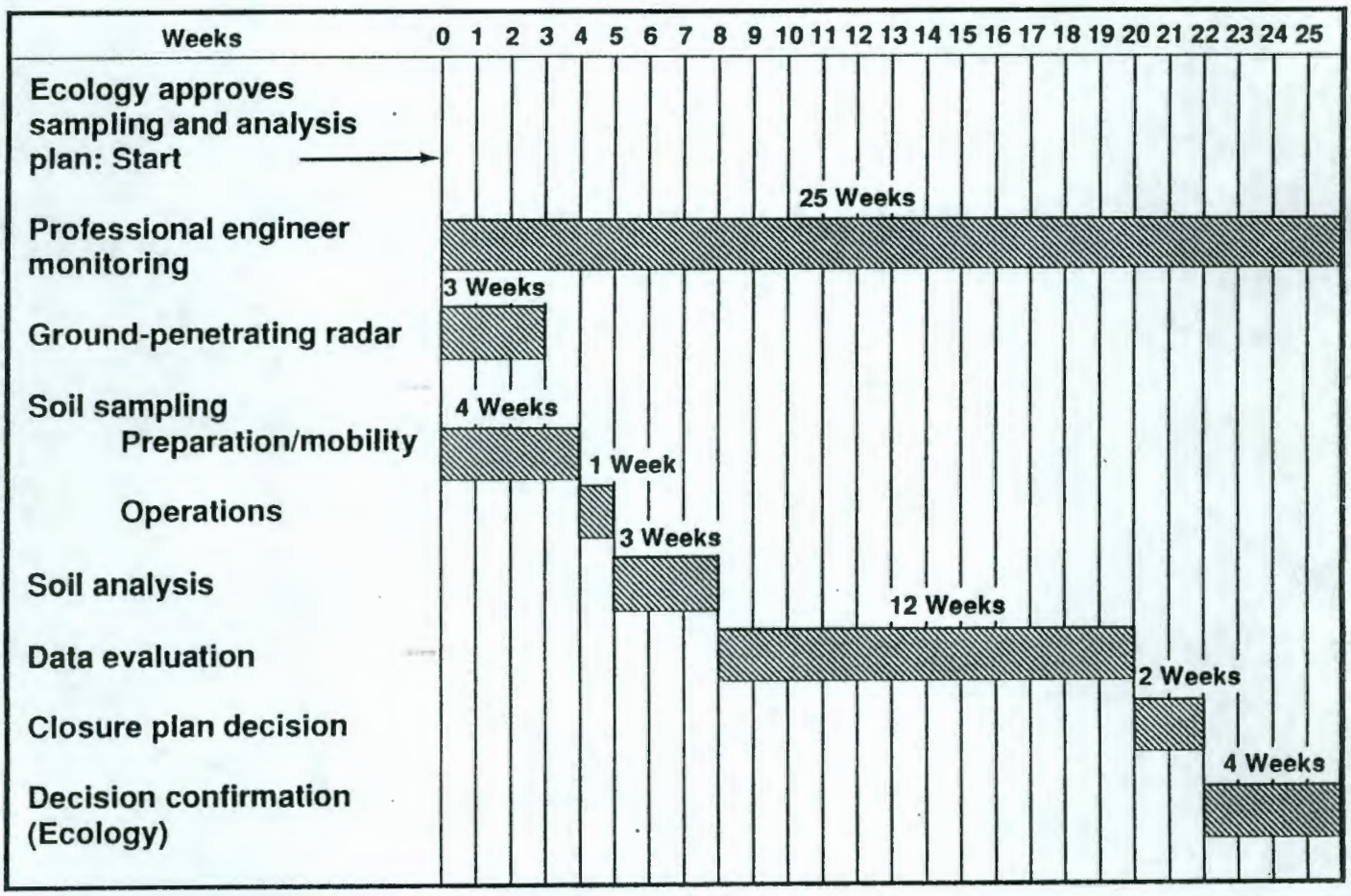

Figure 7-3. Hanford Patrol Academy Demolition Sites Closure Schedule.

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CLOSURE CERTIFICATION
FOR

_____

Hanford Site
U.S. Department of Energy, Richland Field Office

We, the undersigned, hereby certify that all _____ _____ closure activities were performed in accordance with the specifications in the approved closure plan.

_____ _____
Owner/Operator Signature DOE-RL Representative Date
(Typed Name)

_____ P.E.# _____ State ___ _____
Signature Independent Registered Professional Engineer Date
(Typed Name, Professional Engineer license number, state of issuance, and date of signature)

Figure 7-4. Typical Closure Certification Document.

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Table 7-1. Hanford Patrol Academy Demolition Sites Closure Area No. 1 Proposed Analytes of Interest, Analytical Methods, and Recommended Holding Time Limits for Investigative Soil Sampling.

Analysis for volatile organics by purge and trap followed by GC/MS (holding time = 14 days to analyze):

- TIC analytes:
  - 2-Butoxyethanol
  - Ethyl ether
  - Tetrahydrofuran

Auxiliary analyses (no holding time limit - analyze immediately after addition of water:

- Soil pH (by H^+ ion selective electrode method)

GC/MS = gas chromatograph/mass spectrometer.
TIC = tentatively identified compound.

Table 7-2. Hanford Patrol Academy Demolition Sites Closure Area No. 2 Proposed Analytes of Interest, Analytical Methods, and Recommended Holding Time Limits for Investigative Soil Sampling.

Analysis for volatile organics by purge and trap followed by GC/MS (holding time = 14 days to analyze):

- TCL analytes:
  - Benzene
  - Carbon disulfide
- TIC analytes:
  - Allyl ether
  - 2-Butoxyethanol
  - Butyl ethanol (aka 2-Hexanol)
  - n-Butyl ether
  - 1,4-Diethoxybutane
  - Dimethoxypropane
  - Dioxane (poor purging analyte)
  - Di-tert butyl ether
  - 2-Ethoxybutanone
  - 2-Ethoxyethanol
  - Ethylene glycol dimethyl ether
  - Ethyl ether
  - Isopropyl ether
  - 2-Methoxyethyl ether
  - 2-Methylfuran
  - Tetrahydrofuran

Analysis for semivolatile organics by SFE followed by GC/MS (holding time = 7 days to extract/40 days to analyze following extraction):

- TCL analytes:
  - Benzoic acid (degradation product of benzoyl peroxide)
  - 2,4-Dinitrophenol
- TIC analytes:
  - 2,4-Dinitroresorcinol
  - Dipicrylamine
  - 2,2',4,4',6,6'-Hexanitrodiphenylamine
  - Naphthacene
  - alpha-Nitrosomethylisobutyl ketone
  - Picryl chloride
  - 1,3,5-Trinitrobenzene
  - 2,4,6-Trinitroresorcinol
  - 2,4,6-Trinitrotoluene

Aqueous extraction followed by direct aqueous injection (holding time = 14 days to analyze):

- n-Butanol (degradation product of butyllithium)
- Unknown glycol compound [Dibutyl tetraethylene glycol (sic)]
- Isopropyl alcohol
- Methanol
- Picric acid

Aqueous extraction followed by ion chromatography (holding time = 28 days to analyze):

- Chloride

Ancillary analyses (no holding time limit - analyze immediately after adding water):

- Soil pH (by H^+ ion selective electrode method)

GC/MS = gas chromatograph/mass spectrometer.
TCL = target compound list.
TIC = tentatively identified compound.
SFE = supercritical fluid extraction.
N/A = not applicable.

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8.0 POSTCLOSURE PLAN

In the event that the HPADS cannot be clean closed and that residual soil contamination remains after soil removal activities, a HPADS postclosure permit application will be submitted in accordance with WAC 173-303 regulations.

8.1 NOTICE IN DEED BOOK

This closure plan proposes that the HPADS be closed with no residual soil contamination that would pose a threat to human health or the environment. However, if closure cannot be secured, the following action will be taken in accordance with WAC 173-303-610(1)(b). Within 60 days of the certification of closure, the DOE-RL will sign, notarize, and file for recording the notice indicated below. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in deed book.

TO WHOM IT MAY CONCERN

The United States Department of Energy, Richland Field Office, an operations office of the United States Department of Energy, which is a department of the United States Government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 265.120 and WAC 173-303-610(10) (whichever is applicable):

(a) The United States of America is, and since April 1943, has been in possession in fee simple of the following described lands: (legal description of the Hanford Patrol Academy Demolition Site)

(b) The United States Department of Energy, Richland Field Office, by operation of the Hanford Patrol Academy Demolition Sites, has disposed of hazardous and/or dangerous waste under other terms of regulations promulgated by the United States Environmental Protection Agency and the Washington State Department of Ecology (whichever is applicable) at the above described land

(c) The future use of the above described land is restricted under terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable)

(d) Any and all future purchasers of this land should inform themselves of the requirements of the regulation and ascertain the amount and nature of wastes disposed on the above property

(e) The United States Department of Energy, Richland Field Office has filed a survey plat with the Benton County Planning Department and with the United States Environmental Protection Agency, Region 10, and the Washington State Department of Ecology (whichever are

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applicable) showing the location and dimensions of the Hanford Patrol Academy Demolition Sites and a record of the type, location, and quantity of waste treated.

8.2 POSTCLOSURE CARE

Postclosure care is required when a TSD unit has residual contamination that poses a problem to human health or the environment. At the HPADS, underlying soils and possibly groundwater might have been contaminated by waste treated during HPADS operations. Under the Tri-Party Agreement, source contamination and groundwater operable units will be investigated and remediated under the CERCLA remedial investigation/feasibility study process.

With the general exception of an imminent environmental hazard, any extensive soil remediation (e.g., multiple firing ranges) will take place under the CERCLA remedial investigation/feasibility study process. While awaiting remediation under the CERCLA process, some level of RCRA monitoring might be necessary to ensure that the HPADS poses no threat to human health or the environment. The scope of the monitoring would be limited to contaminated soil that would pose a threat to human health or the environment. The HPADS might not be considered closed until the remediation under the CERCLA process is complete. Before any soil remediation under CERCLA, steps might be taken to isolate any contamination (Chapter 7.0). The exact nature of these steps would be determined at the time the need was identified, and this information would be added to the closure plan. In addition, access to the areas of contamination would be controlled, to protect personnel and prevent the migration of contamination.

During the period between closure of the HPADS and soil remediation under CERCLA, the closure areas would be inspected yearly at a minimum. The inspections would determine the need for maintenance of any temporary covers or other physical barriers. Any required maintenance would be performed by Hanford Site personnel.

Any data obtained from sampling and analyses during RCRA closure activities will be part of the official record and will be included in the closure plan. These data will be taken into account and used during the CERCLA evaluation of the 1100-EM-1 operable unit, as well as any data collected specifically for the CERCLA evaluation.

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9.2 CODE OF FEDERAL REGULATIONS AND FEDERAL REGISTER

29 CFR 1910, "Occupational Safety and Health Standards," Title 29, *Code of Federal Regulations*, Part 1910, as amended, Occupational Safety and Health Administration, Washington, D.C.

40 CFR 141, "National Primary Drinking Water Regulations", Title 40, *Code of Federal Regulations*, Part 141, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 262, "Standards Applicable to Generators of Hazardous Waste, Title 40, *Code of Federal Regulations*, Part 262, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities", Title 40, *Code of Federal Regulations*, Part 265, as amended, U.S. Environmental Protection Agency, Washington, D.C.

49 CFR 172, "Hazardous Materials Tables and Hazardous Materials Communications Requirements and Emergency Response Information Requirements," Title 49, *Code of Federal Regulations*, Part 172, as amended, U.S. Department of Transportation, Washington, D.C.

49 CFR 173, "Shippers-General Requirements for Shipments and Packaging," Title 49, *Code of Federal Regulations*, Part 173, as amended, U.S. Department of Transportation, Washington, D.C.

49 CFR 178, "Shipping Container Specification," Title 49, *Code of Federal Regulations*, Part 178, as amended, U.S. Department of Transportation, Washington, D.C.

49 CFR 179, "Specifications for Tank Cars," Title 49, *Code of Federal Regulations*, Part 179, as amended, U.S. Department of Transportation, Washington, D.C.

9.3 FEDERAL AND STATE ACTS

Atomic Energy Act of 1954, 42 USC 2011 et seq.

Clean Water Act of 1977, 33 USC 1251 et seq.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601 et seq.

Resource Conservation and Recovery Act of 1976, 42 USC 6901 et seq.

State of Washington Hazardous Waste Management Act of 1976, Revised Code of Washington, Chapter 70.105 et seq., Olympia, Washington.

9.4 REVISED CODE OF WASHINGTON AND WASHINGTON ADMINISTRATIVE CODE

WAC 173-303, *Dangerous Waste Regulations*, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340, *Model Toxics Control Act Cleanup Regulations*, as amended, Washington State Department of Ecology, Olympia, Washington.

9.5 U.S. DEPARTMENT OF ENERGY ORDERS

5400.1, *General Environmental Protection Program Requirements*

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APPENDICES

2A PHOTOGRAPHS

3A EXISTING SOIL SAMPLING INFORMATION FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

4A WASTE INVENTORIES

5A GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

7A QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND ANALYSIS FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

7B TRAINING COURSE DESCRIPTIONS

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APPENDIX 2A

PHOTOGRAPHS

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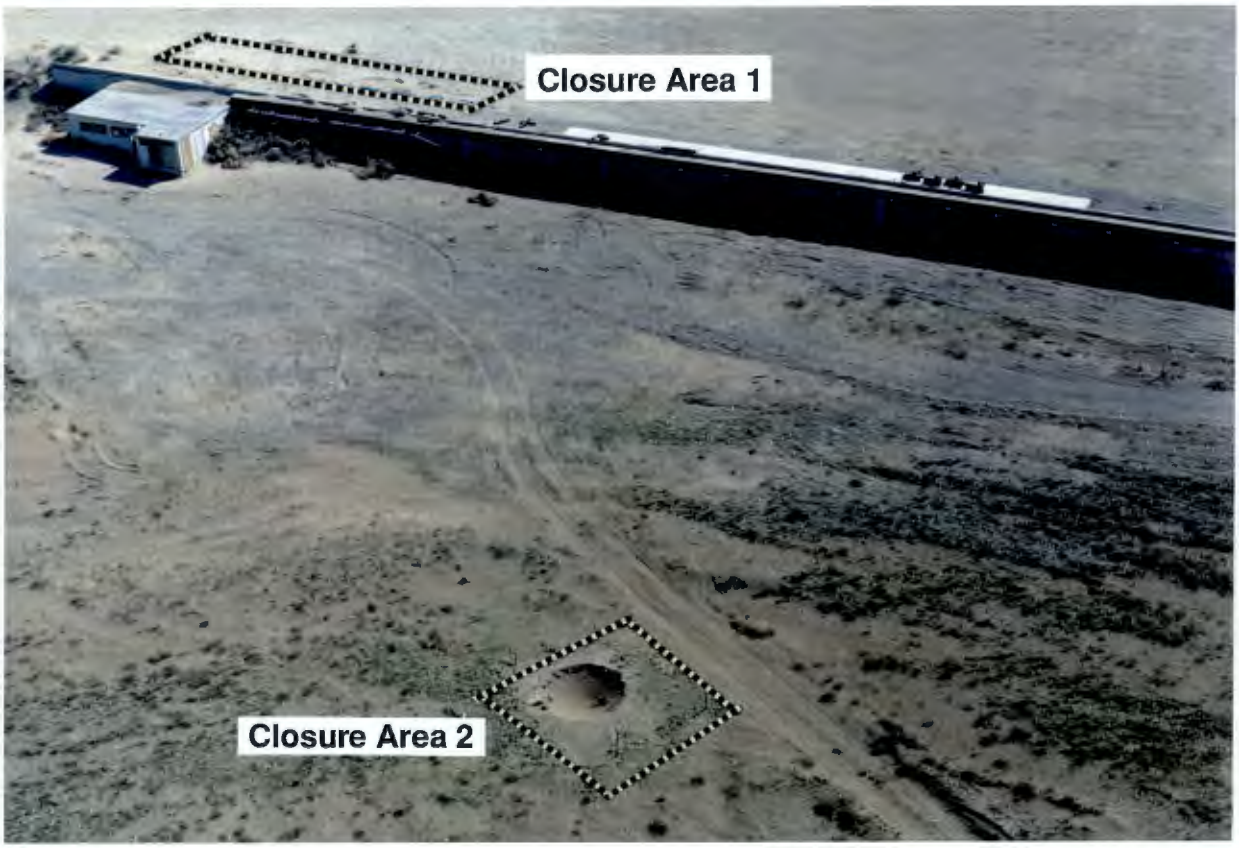

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(PHOTO TAKEN 1990)

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APPENDIX 3A

EXISTING SOIL SAMPLING INFORMATION FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

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HANFORD ENVIRONMENTAL
HEALTH FOUNDATION

September 4, 1990 CO# 15711

Westinghouse Hanford Company
MSIN R2-82

Attn: K.A. Ayster

SOIL ANALYSIS

The results of the analyses performed on the two soil samples received June 21, 1990, are tabulated below. These samples were reportedly from the detonation pit.

The samples were anlayzed for 1,3,5-trinitrobenzene (TNB), total lithium, and total aluminum. The analyses were performed by ATI in accordance with approved protocols.

Sample ID	Sample Description	Total Metals mg/Kg	Organics mg/Kg
Det-90-01-A	Sandy Soil	5970 Aluminum 8.6 Lithium	<0.34 1,3,5-TNB
Det-90-01-B	Sandy Soil	6220 Aluminum 8.1 Lithium	<0.17 1,3,5-TNB

Your samples are being returned to you for disposal.

If you have any questions regarding this report, please contact Environmental Health Sciences.

T. J. Gilfoil
Environmental Health Sciences

kw

P. O. BOX 100, RICHLAND, WASHINGTON 99352

Enclosed are copies of the hazardous waste request forms of your recently submitted waste samples. Please keep these on file. If anyone does have questions about the samples please refer to the MCHF COnumber and/or sample number(s) in the top right corner.

THANK YOU
EHS lab staff

0 3 1 3 7 5 2 1 9 7 0

HANFORD ENVIRONMENTAL HEALTH FOUNDATION

805 Goethals Drive, Richland WA 99352

OIL & HAZARDOUS WASTE ANALYSIS REQUEST FORM

(Samples will not be accepted with out all necessary, properly completed paper work)

Sample # Det-90-01-D

REQUESTOR

Name K.A. Ayster Company WHC
Bldg/Area 2750E-200E Phone 3-5015
Work Order ML82E MSIN R2-82

For Lab Use Only
CO # 15711
Rec'd 6-21-90
Log # E90-6-691

SAMPLE CONTAINERS - All oils and organic samples shall be submitted in glass containers with teflon-lined caps. Other samples shall be submitted in containers appropriate for the requested analyses. Consult HEHF lab (6-6980) for assistance in container selection and sample quantity requirements.

SAMPLE DESCRIPTION

Sampling Location Detonation Pit

Method of Sampling
___Glass tubing
___Coliwasa
X Other(describe) Pick up Dirt & place in bottle

Type of Container
___55 gal. drum
___Transformer
___Hydraulic System
X Other(describe) Glass Bottle

Description of material sampled (Label information, transformer #, original use, drum #, suspected concentrations etc) Soil from the detonation Pit Materials detonated were: ethyl Ether, litium Aluminum Hyride, and 1,3,5 - Trinitrobenzene

Is sample submitted representative of all phases present in container sampled? Yes

Is a radiation survey needed? No
If "yes": external only ___
: external & internal ___
(Copy of all survey data must be attached)

CHAIN OF CUSTODY

Sampled by J.W. Olson
Date Sampled 6-7-90
Date Relinquished 6-7-90

Received by K.A. Ayster
Date Received 6-7-90
Date Relinquished —

Shipped by K.A. Ayster
Date Received 6-7-90
Date Relinquished 6-21-90

Received for Lab ___
Date Received ___
Storage Location ___

REQUESTED ANALYSES

___PCBs Required Detection Limit: ___2 ppm ___1 ppm ___0.05 ppm ___Other
___Ignitability (Flash Point)
___Halogenated Hydrocarbons
___Corrosivity: ___pH ___Steel Corrosion
___EP Toxicity: ___8 Metals ___Pesticides
___Other Metals (list)___
___Solvent ID by GCMS
___Other Analysis (Specify) Ethyl Ether, Lithium, Aluminum, 1,3,5-Trinitrobenzene
___Oil Metals (As, Cd, Cr, Pb)
___Polynuclear Aromatics (PAHs)
___Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)
___Basic cations (Na, K, NH_3)
___Glycols
___Reactivity

REPORTING DEADLINE

Does sample have 90/day clock running or other compliance deadline? No

If yes, clock start date ___
or compliance due date ___
If no, desired due date ___

SEND REPORT TO

Name K.A. Ayster
MSIN R2-82

RETURN SAMPLE TO

Name M.R. Romsos
Bldg 2750E Area 200E

Rev. 03-05-90

3 1 2 7 2 1 9 7 1

HANFORD ENVIRONMENTAL HEALTH FOUNDATION

805 Goethals Drive, Richland WA 99352

OIL & HAZARDOUS WASTE ANALYSIS REQUEST FORM

(Samples will not be accepted with out all necessary, properly completed paper work)

sample # Det-90-01-A

REQUESTOR

Name K. A. Ayster Company WHC
Bldg/Area 2750E/200E Phone 3-5015
Work Order MC82E MSIN R2-82

For Lab Use Only
CO # 15711
Rec'd 6-21-90
Log #E90-6-690

SAMPLE CONTAINERS - All oils and organic samples shall be submitted in glass containers with teflon-lined caps. Other samples shall be submitted in containers appropriate for the requested analyses. Consult HEHF lab (6-6980) for assistance in container selection and sample quantity requirements.

SAMPLE DESCRIPTION

Sampling Location Detonation Pit

Method of Sampling
___Glass tubing
___Coliwasa
X Other(describe) Pick up dirty place in Bottle

Type of Container
___55 gal. drum
___Transformer
___Hydraulic System
X Other(describe) Glass bottle

Description of material sampled (Label information, transformer #, original use, drum #, suspected concentrations etc) Soil from the detonation pit. Materials detonated were: ethylether, litium aluminum Hydride and 1,3,5-trinitrobenzene.

Is sample submitted representative of all phases present in container sampled? yes

Is a radiation survey needed? NO
If "yes": external only ___
: external & internal ___
(Copy of all survey data must be attached)

CHAIN OF CUSTODY

Sampled by J.W. Olson
Date Sampled 6-7-90
Date Relinquished 6-7-90

Received by K.A. Ayster
Date Received 6-7-90
Date Relinquished ___

Shipped by K.A. Ayster
Date Received 6-7-90
Date Relinquished 6-21-90

Received for Lab ___
Date Received ___
Storage Location ___

REQUESTED ANALYSES

___PCBs Required Detection Limit: ___2 ppm ___1 ppm ___0.05 ppm ___Other
___Ignitability (Flash Point)
___Halogenated Hydrocarbons
___Corrosivity: ___pH ___Steel Corrosion
___EP Toxicity: ___8 Metals ___Pesticides
___Other Metals (list) ___
___Solvent ID by GCMS
___Other Analysis (Specify) ethyl Ether, lithium, Aluminum, 1,3,5-trinitrobenzene.
___Oil Metals (As, Cd, Cr, Pb)
___Polynuclear Aromatics (PAHs)
___Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)
___Basic cations (Na, K, NH_3)
___Glycols
___Reactivity

REPORTING DEADLINE

Does sample have 90 day clock running or other compliance deadline? NO

If yes, clock start date ___
or compliance due date ___
If no, desired due date ___

SEND REPORT TO

Name K. A. Ayster
MSIN R2-82

RETURN SAMPLE TO

Name Mr. Romano
Bldg 2750E Area 200E

Rev. 03-05-90

9312752521972

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HANFORD ENVIRONMENTAL HEALTH FOUNDATION

February 26, 1990 CO 14242

Westinghouse Hanford Company
MSIN D2-65

Attn: M. R. Romsos

WASTE CHARACTERIZATION - DEMOLITION SITE SOIL

The following are the results of the analysis of the soil sample received July 21, 1989. This sample was reportedly soil from the demolition site at the Patrol Academy. The purpose of the analysis was to look for residual contamination from the materials detonated during the last year.

Benzene was determined on a methanol extract of the soil in accordance with USEPA methods 8021 and 5030 (SW-846, 3rd Ed.) using purge and trap followed by gas chromatography with photoionization detection. 1,4-Dioxane was determined on the same methanol extract using direct injection into a gas chromatograph with flame ionization detection.

The remaining analyses were done by Analytical Technologies, Inc. Hydrazine was determined colorimetrically in accordance with ASTM D1385. A semi-volatiles GC/MS scan was done following EPA method 8270 (SW-846, 2nd Ed.). The purpose of this scan was to look for nitrophenols and other possible combustion products. The complete list of compounds scanned is attached.

Sample ID	Analytical Results
DET-89-04	<0.125 mg/Kg benzene <5 mg/Kg 1,4-dioxane 0.084 mg/Kg hydrazine No 2,4-dinitrophenol or other semi-volatiles noted (see attached for compound list and detection limits)

Your sample is being returned to you for disposal.

If you have any questions regarding this report, please contact Environmental Health Sciences.

Maureen K. Hamilton

M. K. Hamilton, CIH
Laboratory Director
Environmental Health Sciences

cc: J. Kessner, OSM, T6-08

AnalyticalTechnologies,Inc.

GCMS - RESULTS

ATI I.D. : 00216801

.EST : EPA 8270 (GC/MS FOR SEMIVOLATILE ORGANICS)

CLIENT	: HANFORD ENVIRONMENTAL HEALTH FND.	DATE SAMPLED	: 01/26/90
PROJECT #	: MSD-STB-431842	DATE RECEIVED	: 01/30/90
PROJECT NAME	: WASTE ANALYSIS	DATE EXTRACTED	: 02/15/90
CLIENT I.D.	: E89-7-466	DATE ANALYZED	: 02/20/90
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
N-NITROSODIMETHYLAMINE	<0.17
PHENOL	<0.17
ANILINE	<0.17
BIS(2-CHLOROETHYL)ETHER	<0.17
2-CHLOROPHENOL	<0.17
1,3-DICHLOROBENZENE	<0.17
1,4-DICHLOROBENZENE	<0.17
BENZYL ALCOHOL	<0.17
1,2-DICHLOROBENZENE	<0.17
2-METHYLPHENOL	<0.17
BIS(2-CHLOROISOPROPYL)ETHER	<0.17
4-METHYLPHENOL	<0.17
N-NITROSO-DI-N-PROPYLAMINE	<0.17
'XACHLOROETHANE	<0.17
.TROBENZENE	<0.17
ISOPHORONE	<0.17
2-NITROPHENOL	<0.17
2,4-DIMETHYLPHENOL	<0.17
BENZOIC ACID	<0.85
BIS(2-CHLOROETHOXY)METHANE	<0.17
2,4-DICHLOROPHENOL	<0.17
1,2,4-TRICHLOROBENZENE	<0.17
NAPHTHALENE	<0.17
4-CHLOROANILINE	<0.17
HEXACHLOROBUTADIENE	<0.17
4-CHLORO-3-METHYLPHENOL	<0.17
2-METHYLNAPHTHALENE	<0.17
HEXACHLOROCYCLOPENTADIENE	<0.17
2,4,6-TRICHLOROPHENOL	<0.17
2,4,5-TRICHLOROPHENOL	<0.85
2-CHLORONAPHTHALENE	<0.17
2-NITROANILINE	<0.85
DIMETHYL PHTHALATE	<0.17
ACENAPHTHYLENE	<0.17
3-NITROANILINE	<0.85
ACENAPHTHENE	<0.17
2,4-DINITROPHENOL	<0.85
'ITROPHENOL	<0.85
ENZOFURAN	<0.17
2,4-DINITROTOLUENE	<0.17
2,6-DINITROTOLUENE	<0.17
DIETHYLPHTHALATE	<0.17

(CONTINUED NEXT PAGE)

AnalyticalTechnologies,Inc. GCMS - RESULTS

ATI I.D. : 00216801

TEST : EPA 8270 (GC/MS FOR SEMIVOLATILE ORGANICS)

COMPOUNDS	RESULTS
4-CHLOROPHENYL PHENYL ETHER	<0.17
FLUORENE	<0.17
4-NITROANILINE	<0.85
4,6-DINITRO-2-METHYLPHENOL	<0.85
N-NITROSODIPHENYLAMINE	<0.17
4-BROMOPHENYL PHENYL ETHER	<0.17
HEXACHLOROBENZENE	<0.17
PENTACHLOROPHENOL	<0.85
PHENANTHRENE	<0.17
ANTHRACENE	<0.17
DI-BUTYL PHTHALATE	<0.17
FLUORANTHENE	<0.17
BENZIDINE	<1.7
PYRENE	<0.17
BUTYLBENZYLPHTHALATE	<0.17
3,3-DICHLOROBENZIDINE	<0.34
BENZO(a)ANTHRACENE	<0.17
BIS(2-ETHYLHEXYL)PHTHALATE	<0.17
CHRYSENE	<0.17
DI-N-OCTYLPHTHALATE	<0.17
BENZO(b)FLUORANTHENE	<0.17
BENZO(k)FLUORANTHENE	<0.17
BENZO(a)PYRENE	<0.17
INDENO(1,2,3-cd)PYRENE	<0.17
DIBENZO(a,h)ANTHRACENE	<0.17
BENZO(g,h,i)PERYLENE	<0.17

SURROGATE PERCENT RECOVERIES

NITROBENZENE-D5 (%)	48
2-FLUOROBIPHENYL (%)	60
TERPHENYL (%)	71
PHENOL-D6 (%)	47
2-FLUOROPHENOL (%)	86
2,4,6-TRIBROMOPHENOL (%)	61

Sampling Plan for Patrol Academy Blasting Pit to Determine Extent of Land Banned Contamination to Soil Onsite

A grid will be set up around the blasting pit (see figure 1). It will consist of radials every 45° aligned to magnetic north (0°) and distances from the pit edge of 10, 20, 30, 40, 50, 75, 100, 150 and 200 feet (the pit is 10 feet in diameter). Seventeen points will be selected from a random number table and numbers 11-19, 21-29, ..., 81-89 accepted.

These points will be plotted on the grid as follows:
0° radial = 1, 45° radial = 2, ..., 315° radial = 8
200 foot mark = 1, 150 foot mark =2, ..., 10 foot mark = 9

Approximately 4 ounces of soil will be taken from each point and placed in a large container (5 gallon pail or bag). The contents will be thoroughly mixed and two samples taken. The remaining soil will be returned to the ground.

Procedure

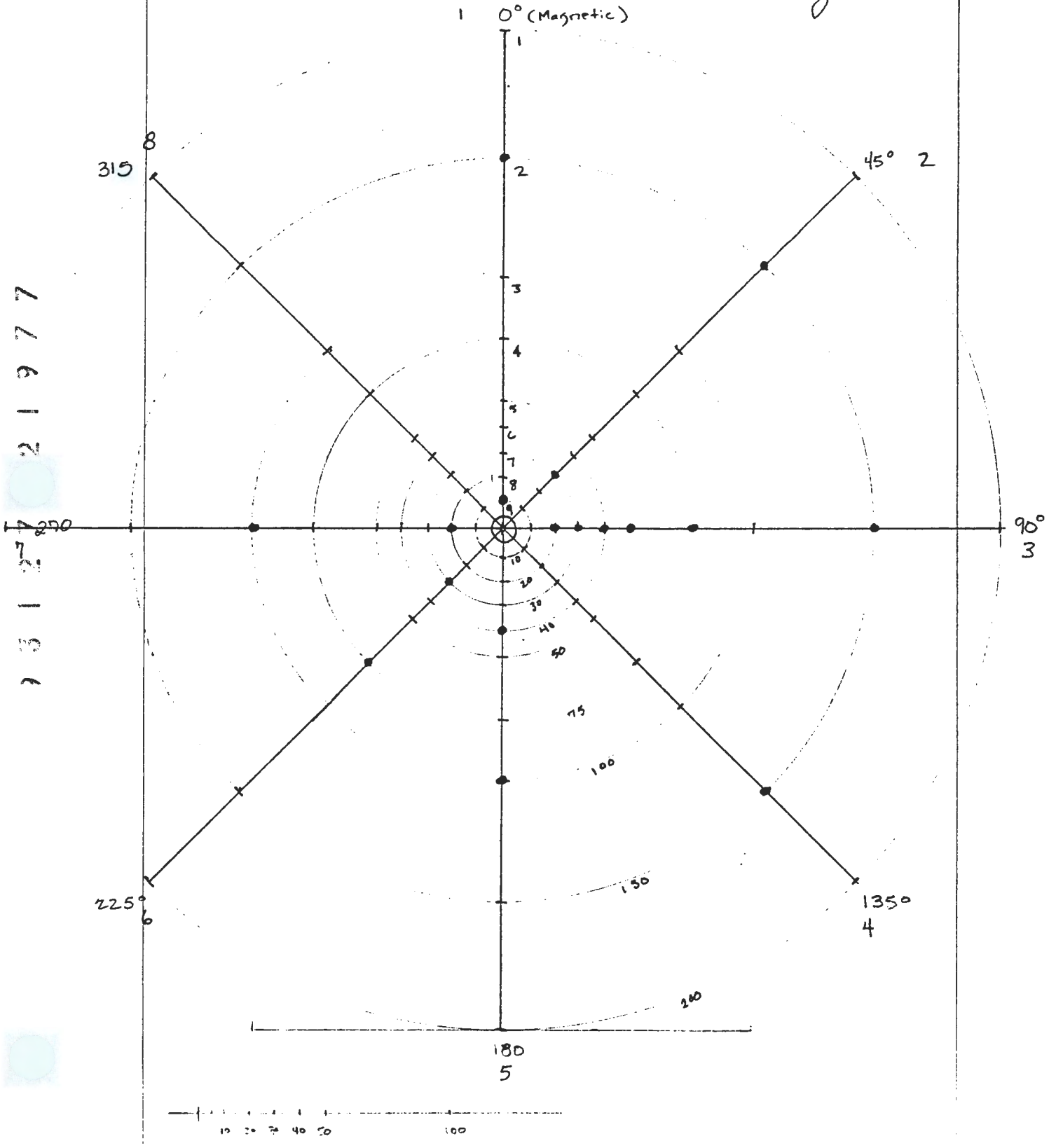
1. Place rod in center of detonation pit
2. Mark distances with tape (10, 20, 30, 40, 50, 75, 100, 150, and 200).
3. Use a compass to find radial and have assistant walk out with rope to sample distance along radial.
4. Take 4 ounces of soil including topsoil and place in container.
5. Repeat steps 3 and 4 until no more points lie along radial.
6. Move to next radial and repeat steps 3 - 5.
7. When completed, mix soil in container well and remove two samples.
8. Pour remaining soil to ground.
9. Mark samples accordingly.

J.W. Olson

Figure 1

Patrol Academy Demolition Pit Sampling Plan

Assumptions: Pit is 10' wide (diameter).
Pit is located 200' from retaining wall.



J. W. Olson

Random Numbers for Sampling Blasting Pit

Sample #	Random Number
1.	75
2.	67
3.	27
4.	35
5.	53
6.	78
7.	34
8.	32
9.	64
10.	19
11.	12
12.	37
13.	22
14.	36
15.	42
16.	56
17.	38

3 3 1 2 7 5 2 1 9 7 8

Northwest EnviroService Inc.

November 14, 1988

Mr. Mike Romsos
Westinghouse Hanford Company
P.O. Box 1970
R1 - 51
Richland, Wa. 99352

Dear Mike,

Please find the enclosed results for NWES Job # 12-6355.01.

The soil samples, marked Det 3 and Det 4, were submitted for Picric Acid Analysis.

If you have any questions or need further information, please feel free to call any time.

Sincerely,

Northwest EnviroService, Inc.

Ali F. San
Lab Administrator

AFS/ts

Enclosures

P.O. Box 24443 • Seattle, WA 98124 • Phone (206) 622-1090 • Toll Free 1-800-521-0714 / Ext. 190

Laucks 80 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Certificate

Chemistry, Microbiology, and Technical Services

CLIENT: Northwest EnviroServices, Inc.
P.O. Box 24443
Seattle, WA 98124
ATTN: Ali San

LABORATORY NO. 12325

DATE: Nov. 11, 1988

PO# 22919

REPORT ON: SOIL

SAMPLE IDENTIFICATION: Submitted 09/29/88 and identified as shown below:

1) Sample #880915 B2
2) Sample #880915 C2

TESTS PERFORMED AND RESULTS:

parts per million (mg/kg), dry basis

	1	2
Picric Acid	0.50	37.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

B. Gleason

BG:emt

This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

Laucks 80 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Certificate

Chemistry, Microbiology, and Technical Services

APPENDIX

Copy of Chain-of-Custody is Attached

This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

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Laucks
Testing Laboratories, Inc.
940 South Harney St Seattle Washington 98108 (206)767-5060

CHAIN OF CUSTODY RECORD

DATE 9/29/88 PAGE X OF 1

NAME: NW ENVIROSERVICE, INC
ADDRESS: P.O. BOX 14443
SEATTLE, WA 98
ATTENTION: ALI SAN
PROJECT NAME:
JOB/PO NO.: 22919
SAMPLER (SIGNATURE) (PRINTED NAME)

LAB NO.	LAB SA #	SAMPLE NO.	DATE	TIME	LOCATION	TESTING PARAMETERS	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
1		880915-B						PICRIC ACID ANALYSIS
2		880915-C						PICRIC ACID "

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: [illegible]	9/29/88	SIGNATURE:	
PRINTED NAME: ALI F. SAN	TIME: 2:45	PRINTED NAME:	TIME:
COMPANY: NW ENVIROSERVICE, INC		COMPANY:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE:		SIGNATURE: F. Collins	9/29/88
PRINTED NAME:	TIME	PRINTED NAME: F. Collins	TIME: 2:45
COMPANY:		COMPANY: LAUCKS TESTING LABS	

TOTAL NUMBER OF CONTAINERS:

SHIPMENT METHOD:

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

INSTRUCTIONS:
1. Shaded areas for lab use only.
2. Complete in ballpoint pen. Draw one line through errors and initial.
3. Be specific in test requests.
4. Check off tests to be performed for each sample.
5. Retain final copy after signing.
6. Provide name and telephone of your contact person.

NAME: ALI F. SAN
TELEPHONE: [illegible]

Romsos

Northwest EnviroService Inc.

LAB REPORT

DATE: 9-15-87

SAMPLE #: 870915-R

GENERATOR NAME: Westinghouse Hanford

GENERATOR SAMPLE #: DET-1

ADDRESS: P.O. Box 1970

WPQ #:

Richland, WA 99352

MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Waste Product Name: Soil

Process Generating Waste: Clean up

Physical State At 70°F.: [X] Solid [ ] Sludge [ ] Liquid [ ] Powder

Free Liquids at 70°F.: [ ] Yes [X] No — Volume ____

Flash Point: [ ] < 70°F. [ ] ≥ 140°F. [ ] Closed Cup [ ] 70°F. - 100°F. [X] No Flash [ ] Open Cup [ ] 101°F. - 139°F. [ ] Exact ____

Layers: [ ] Multilayered [ ] Bi-Layered [X] Homogenous

pH: [ ] < 2 [ ] 10.1 - 12 [ ] 2 - 4 [ ] > 12 [ ] 4.1 - 10 [X] Exact 6.7

Solids: [ ] By Volume — Total Ca 100 % — Dissolved ____ % — Suspended ____ %

Density (Sp. G.): >1 — [ ] Liquid ____ lbs./gal. [ ] Solid ____ lbs./ft.³

Odor: [X] None [ ] Strong [ ] Mild — Describe ____

Color: Brown

METALS

Total (PPM) [ ] EPA Extraction Procedure (mg/L)

Arsenic (As)	ND	Mercury (Hg)	ND
Barium (Ba)	ND	Nickel (Ni)	7
Cadmium (Cd)	<0.1	Selenium (Se)	ND
Chromium (Cr)	<0.1	Silver (Ag)	ND
Copper (Cu)	8	Zinc (Zn)	30
Lead (Pb)	14	Nondetectable	

REACTIVES AND OTHER WASTES (PPM)

Amines		PCB S	≤1
Cyanides		Other's	
Sulfides			

WASTE PRODUCT CHEMICAL COMPOSITION *(Account For 100% of Total)*

		Other (Specify):	
H_2O	%	Dirt/wood/grass CA 100	%
HCl	%		%
H_2SO_4	%		%
HNO_3	%		%
NaOH	%		%
Phenols	%		%
Chlorides	%		%

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed waste	< 500 mg/L		

COMMENTS: ____

LYSIS PERFORMED BY: TAR/RB

P.O. Box 24443 • Seattle, WA 98124 • 1500 Airport Way South • Seattle, WA 98134 • Phone (206) 622-1090

Romsos

Northwest EnviroService Inc.

LAB REPORT

DATE: 9-15-87

SAMPLE #: 870915-S

GENERATOR NAME: Westinghouse Hanford

GENERATOR SAMPLE #: DET-2

ADDRESS: P.O. Box 1970
Richland, WA 99352

WPQ #:

MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Waste Product Name: Soil

Process Generating Waste: Clean up

Physical State At 70°F.: ☒ Solid ☐ Sludge ☐ Liquid ☐ Powder

Free Liquids at 70°F.: ☐ Yes ☒ No — Volume

Flash Point: ☐ < 70°F. ☐ ≥ 140°F. ☐ Closed Cup ☐ 70°F. - 100°F. ☒ No Flash ☐ Open Cup ☐ 101°F. - 139°F. ☐ Exact

Layers: ☐ Multilayered ☐ Bi-Layered ☒ Homogenous

pH: ☐ < 2 ☐ 10.1 - 12 ☐ 2 - 4 ☐ > 12 ☐ 4.1 - 10 ☒ Exact 7.3

Solids: ☐ By Volume — Total Ca 100 % — Dissolved % — Suspended %

Density (Sp. G.): > 1 — ☐ Liquid lbs./gal. — ☐ Solid lbs./ft.³

Odor: ☒ None ☐ Strong ☐ Mild — Describe

Color: Brown

METALS

☒ Total (PPM) ☐ EPA Extraction Procedure (mg/L)

Arsenic (As)	ND	Mercury (Hg)	ND
Barium (Ba)	ND	Nickel (Ni)	6
Cadmium (Cd)	< 1	Selenium (Se)	ND
Chromium (Cr)	2	Silver (Ag)	ND
Copper (Cu)	9	Zinc (Zn)	30
Lead (Pb)	16	Nondetectable	

REACTIVES AND OTHER WASTES (PPM)

Amines	ND	PCB S	≤ 1
Cyanides	ND	Other's	
Sulfides	ND		

WASTE PRODUCT CHEMICAL COMPOSITION *(Account For 100% of Total)*

		Other (Specify):	
H_2O	%	Dirt/Wood/Grass	Ca 100 %
HCl	%		%
H_2SO_4	%		%
HNO_3	%		%
NaOH	%		%
Phenols	%		%
Chlorides	%		%

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed Wastes	< 500 mg/L		

COMMENTS:

ANALYSIS PERFORMED BY: TAR/RB

P.O. Box 24443 • Seattle, WA 98124 • 1500 Airport Way South • Seattle, WA 98134 • Phone (206) 622-1090

Romsos

Northwest EnviroService Inc.

LAB REPORT

DATE: 9-15-87

SAMPLE #: 870915-T

GENERATOR NAME: Westinghouse Hanford

GENERATOR SAMPLE #: DET3

ADDRESS: P.O. Box 1970
Richland, WA 99352

WPQ #:

MANIFEST #:

GENERATOR CONTACT: Mike Romsos

NWES CONTACT: Joe Nessel

PROJECTED WASTE VOLUME: x DRUMS BULK VOLUME GALLONS

Waste Product Name: Soil

Process Generating Waste: Clean up

Physical State At 70°F.
- [x] Solid
- [ ] Sludge
- [ ] Liquid
- [ ] Powder

Free Liquids at 70°F.
- [ ] Yes
- [x] No

Volume _____

Flash Point
- [ ] < 70°F.
- [ ] ≥ 140°F.
- [ ] Closed Cup
- [ ] 70°F. - 100°F.
- [x] No Flash
- [ ] Open Cup
- [ ] 101°F. -139°F.
- [ ] Exact _____

Layers
- [ ] Multilayered
- [ ] Bi-Layered
- [x] Homogenous

pH
- [ ] < 2
- [ ] 10.1 - 12
- [ ] 2 - 4
- [ ] > 12
- [ ] 4.1 - 10
- [x] Exact 7.0

Solids
- [ ] By Volume
- Total Ca 100 %
- Dissolved _____ %
- Suspended _____ %

Density (Sp. G.)
- > 1
- [ ] Liquid lbs./gal.
- [ ] Solid lbs./ft.³

Odor
- [x] None
- [ ] Strong
- [ ] Mild
- Describe _____

Color
Brown

METALS

Total (PPM) [ ] EPA Extraction Procedure (mg/L)

Arsenic (As)	ND	Mercury (Hg)	ND
Barium (Ba)	ND	Nickel (Ni)	7
Cadmium (Cd)	< 1	Selenium (Se)	ND
Chromium (Cr)	< 1	Silver (Ag)	ND
Copper (Cu)	9.9	Zinc (Zn)	40
Lead (Pb)	17	Nondetectable	

REACTIVES AND OTHER WASTES (PPM)

Amines	ND	PCB S	< 1
Cyanides	ND	Other's	
Sulfides	ND		

WASTE PRODUCT CHEMICAL COMPOSITION *(Account For 100% of Total)*

		Other (Specify):	
H_2O	%	Dirt/Wood/Grass	100 %
HCl	%		%
H_2SO_4	%		%
HNO_3	%		%
NaOH	%		%
Phenols	%		%
Chlorides	%		%

ADDITIONAL TESTS

TEST	CONCENTRATION	TEST	CONCENTRATION
F-listed Wastes	<500 mg/L		

COMMENTS: _____

ALYSIS PERFORMED BY: TAR/RB

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APPENDIX 4A

WASTE INVENTORIES

9 3 1 2 7 2 1 9 3 6

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9 5 1 2 7 5 2 1 9 3 7

Battelle
Pacific Northwest Laboratories

Project Number _____

Internal Distribution

JMH - File/LB

Date August 27, 1984

To Leonard Lust

From Jeene Hobbs Jeene

Subject CHEMICAL DISPOSAL

Disposal request approval for #PNL-84-004, 25# of ether, is no longer needed. This chemical plus 6 quarts of tetrahydrofuran and 7 pints of perchloric acid from #PNL-84-007, 1/2 pint of perchloric acid from #PNL-83-020, and 4500 mL of 2-butoxyethanol from #PNL-83-014 were exploded by the Richland Bomb Squad on August 16, 1984. This information is provided to help you update your records.

If you have any questions, please contact me on 376-1361.

/slw

9 5 1 2 7 2 1 9 2 3

REQUEST TO DISPOSE OF NONRADIOACTIVE HAZARDOUS WASTE

PNL-84-004

I. GENERATION: The Generator should complete Part I and forward this form to: WS&DT
202-S/200 West
Rockwell

A. Generator's Name: Jeene Hobbs Phone: 6-1631 Address: 3762/300 Area Company: PNL

B. Custodian's Name: Al Scott Phone: _____ Address: _____ Company: _____

C. Waste Description: (If more than five items, attach additional sheets)

Generic Name	Total Quantity	Type of Container	Number of Containers	(Check One) Sol.	Liq.	Gas	Hazard Class
1. Ether - dated 11/80	25#	metal	25		X		Flammable liq
2. (these cans have never been opened - but they are way past their shelflife.)							
3.							
4.							
5.							

D. Have appropriate labels been affixed to containers? _____ Not required _____

E. Have efforts been made to recycle (e.g., excess) waste? NA

F. Has waste been treated in any manner? no If so, how? _____

G. Storage Location: 332/300 Area

H. "I hereby certify that this material has been released by Radiation Monitoring (if applicable) and that Part One of this form has been completed to the best of my knowledge." Survey Card Number: _____

Generator's Signature: Jeene Hobbs Jeene M Hobbs Date: 27 January 84

2762119989

II. APPROVAL

A. Approved for disposal by Name: _____ Phone: _____ Address _____ Co.: _____

Date: _____ Signature: _____

B. Packaging Requirements (specify): _____

C. Disposal Location: _____ Chemical Trench, _____ Asbestos Trench,
(check one) _____ 212-P (Storage), _____ Other

III. TRANSPORTATION/DISPOSAL

A. Transporter(s) Name: _____ Phone: _____ Address: _____ Company _____

B. Date Transported/Disposed: _____

C. Transporter(s) Signature: _____

BC-6700-174.1 (N-1-82)

REQUEST TO DISPOSE OF NONRADIOACTIVE HAZARDOUS WASTE

PNL-83-014

3-27

I. GENERATION: The Generator should complete Part I and forward this form to: WS&DT, 202-S/200 West, Rockwell

A. Generator's Name: Jeene Hobbs Phone: 6-1631 Address: 3762 Company: PNL

B. Custodian's Name: Jack McCarthy Phone: Address: 326 Company: HEDL

C. Waste Description: (If more than five items, attach additional sheets)

Generic Name	Total Quantity	Type of Container	Number of Containers	(Check One) Sol.	Liq.	Gas	Hazard Class
6-17 1. 1,4-dioxane D.W.	3 pt	1 pt glass	3		X		flammable liq
2. nitromethane	1 pt	glass	1		X		flammable
3. methylene chloride	2 pt	1 pt glass	2		X		ORM-A
4. Anhydrone	1#	glass	1		X		
5. 2 butoxyethanol (ethylene glycol monobutyl ether)	4500 ml	500ml glass	9		X		Combustible

D. Have appropriate labels been affixed to containers? Not required They will be.

E. Have efforts been made to recycle (e.g., excess) waste? no

F. Has waste been treated in any manner? no If so, how?

G. Storage Location: 332/300 Area

H. "I hereby certify that this material has been released by Radiation Monitoring (if applicable) and that Part One of this form has been completed to the best of my knowledge." Survey Card Number:

Generator's Signature: Jeene Hobbs Jeene M Hobbs Date: 25 May 83

II. APPROVAL

A. Approved for disposal by Name: G.R. Cox Phone: 3-3679 Address: 202-S/200 W Co.: Rockwell

Date: June 6, 1983 Signature: Gary R. Cox

B. Packaging Requirements (specify): Package #7 & 8 in absorbant for offsite shipment. All others packed in absorbant for onsite disposal at the chemical trench.

C. Disposal Location: X Chemical Trench, Asbestos Trench,

(check one) 212-P (Storage), 2727-S/200-W Other (offsite shipment)

III. TRANSPORTATION/DISPOSAL

A. Transporter(s) Name: Phone: Address: Company

B. Date Transported/Disposed:

C. Transporter(s) Signature:

BC-6700-174.1 (N-1-82)

2 1 9 9 0

9 3 1 2 7

9 3 1 2 7 6 2 1 9 9 1

Chemical Waste Disposal Logsheet

Disposal Request Number	Date	Chemical/Generator	RHO approval date	Manifest Number & date
PNL-84-001	2-2-84	Russ Barrows / Berta Thomas Ed Blanton / ~~Al Scott~~ mixed organics	June 25, 1984	
PNL-84-002	1-27-84	Mercury Pat Raney Pat Hackett Scott Wilbur	June 12, 1984 x	
PNL-84-003	1-27-84.	SRC, crude oil, shale oil wash / Al Scott		
PNL-84-004	1-27-84	Ether - dated 11/80 Al Scott		← Blown up 8/26/84 by Richland Bomb Squad
PNL-84-005	1-27-84	Hg contaminated lab waste liq - Al Scott	June 12, 1984 x	
PNL-84-006	2-7-84	Calcium nitrate / Sodium nitrate Rob Cuello - lg fiberboard	June 25, 1984 x	
PNL-84-007	2-7-84	329 Chemical Storage Art Bruce	June 12, 1984	84-005
PNL-84-008	2-28-84	Misc Solids 329 Bldg	June 25, 1984	
PNL-84-009	2-28-84	Bromine Perchloric Acid	June 25, 1984	
PNL-84-010	2-28-84	3705 Photo chemicals	June 25, 1984	
PNL-84-011	2-28-84	Karl Pool 314	June 25, 1984	
PNL-84-012	3-6-84 Sent 4-23-84	Mercury & Phenol Soln Terry Dana / Kris McFadden	June 12, 1984 x	
PNL-84-013	4-23-84	2317 Mike McCoy	June 18, 1984	
PNL-84-014 was PNL-83-022	6-11-84	1717K Richard McDowell	July 9, 1984	OCC for Asphalt Emulsion

Battelle
Pacific Northwest Laboratories

Project Number

Internal Distribution

IH&S
GR Cox, RHO
JT Denovan
M Romsos, RHO
JMH File/LB

Date October 12, 1984

To Building Managers

From J. M. Hobbs slw for 6-1631

Subject DISPOSAL OF PEROXIDE-FORMING CHEMICALS

Rockwell is organizing a site-wide ether and peroxide-forming chemical disposal. This is a one-time event to clean out storage of old ethers and peroxide-forming chemicals.

The worst of the peroxide-forming compounds are ethers, acetals, dienes, amides, and vinyl momomers. Some of the chemicals react with air to produce explosive peroxides even without concentration. Some common peroxide-forming chemicals are listed below.

Common Peroxide-Forming Chemicals

Diethyl ether (ethyl ether)
Diisopropyl ether
? { Cyclohexene
Cyclooctene
Decalin
p-dioxane
Tetrahydrofuran
Tetralin
Vinyl acetone

Perchloric acid and picric acid solutions may also be included for disposal.

Please identify peroxide-forming chemicals that need to be disposed and their location on the attached form and return to me no later than October 19. My address is 3762 Bldg/300 Area/PNL.

If you have any questions, contact me on 376-1631.

/slw

RECEIVED
OCT 16 1984
E. R. JUB

9312721972

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By R.T. Hallen Building No. PSL

1 Box of Misc. Bottles of Items for Disposal

Chemical Name	Number of Containers	Container Size	Container Type	Location
THF	3	1 gal/1 l	glass	~~508~~ 605/PSL
Phenol	1	1 lb	"	"
ammonium Sulfide Sol	3	1 pt.	"	"
Dichloro Ethane	1	1 l	"	"
+ several small bottles of assorted chem.				

RETURN TO J. M. HOBBS - 3752/300/PNL

9 3 1 3 7 3 2 1 9 9 3

Bill – do you [illegible]

Project Number ~~[illegible]~~

X = PCW
~~[illegible]~~
Please respond to Hobbs.
Jmm

Battelle
Pacific Northwest Laboratories

Internal Distribution
WJ Apley
MC Bampton
TD Chikalla
TJ Doherty
WA Glass
CR Hann
GJ Posakony
PM Potter
RA Stokes
BE Vaughan
File/LB

Date October 19, 1984

To Distribution

From Ernie Job Ernie Job

Subject Peroxide Forming Chemicals Disposal

The attached memo with a form for listing subject chemicals for disposal asks for an unrealistic response date. Please prepare the list anyway, as quickly as possible, for EDL, PSL, CEL, MDL, MRC, RTL, 2400 Stevens and 100D.

Return the completed form to Ernie Job in ESB. We will compile the lists and send the information to Jeanne Hobbs.

ERJ:ds

Attachment

9 3 1 2 7 2 1 9 9 4

RECEIVED
OCT 19 1984
T.D. CHIKALLA

94-1900-CC1 (3-71)

Battelle
Pacific Northwest Laboratories

Project Number _____

Internal Distribution

IH&S
GR Cox, RHO
JT Denovan
M Romsos, RHO
JMH File/LB

Date October 12, 1984

To Building Managers

From J. M. Hobbs slw for

Subject DISPOSAL OF PEROXIDE-FORMING CHEMICALS

Rockwell is organizing a site-wide ether and peroxide-forming chemical disposal. This is a one-time event to clean out storage of old ethers and peroxide-forming chemicals.

The worst of the peroxide-forming compounds are ethers, acetals, dienes, amides, and vinyl momomers. Some of the chemicals react with air to produce explosive peroxides even without concentration. Some common peroxide-forming chemicals are listed below.

Common Peroxide-Forming Chemicals

Diethyl ether (ethyl ether)
Diisopropyl ether
Cyclohexene
Cyclooctene
Decalin
p-dioxan
Tetrahydrofuran
Tetralin
Vinyl acetone

376-1631

Perchloric acid and picric acid solutions may also be included for disposal.

Please identify peroxide-forming chemicals that need to be disposed and their location on the attached form and return to me no later than October 19. My address is 3762 Bldg/300 Area/PNL.

If you have any questions, contact me on 376-1631.

/slw

RECEIVED
OCT 19 1984
R & NS

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By Fred Burton Building No. LSL-II

Chemical Name	Number of Containers	Container Size	Container Type	Location
ETHYLENE GLYCOL MONOMETHYL ETHER	1	GAL	PLASTIC	1311
PERCHLORIC ACID 70%	2	PINT	GLASS	1420

RETURN TO J. M. HOBBS - 3762/300/PNL

9312721996

Zenker's

1000 ml H_2O
50 gm Hg chloride
2.5 gm K dichromate
10 gm Sodium sulfate
5 ml glacial acetic to 100 ml soln

Battelle
Pacific Northwest Laboratories

Project Number _____

RECEIVED
APR 11 1985
R & NS

Internal Distribution
FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs Jeene

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

2x 1.5 pound Perchloric Acid 70% - LSB-II -1420

Margaret McCulloch - 375 - 2175
-2978

4-10-85 M.Mc

9312721993

Battelle
Pacific Northwest Laboratories

RECEIVED
APR 15 1985
R & NS

Project Number _____

Internal Distribution
SK Campbell
JS Fruchter
FO Gladfelder
CL Nelson
File
LB

Date April 12, 1985

To Jeene M. Hobbs - Lab Safety

From T. Randy Pahl - Geosciences R&E

Subject Chemical Disposal

Ref: Hobbs to PNL Building Managers, April 5, 1985

The Precipitation Chemistry Network uses Rooms 1415, 1419, and 1514 of Sigma V. All of these laboratory rooms have been searched for the items mentioned in the referenced memo, and none were found.

Since your last visit, we have accumulated 3 gallons of phenol in water waste (126 gram/gal). This is located in Room 1415 of Sigma V.

TRP/van

T. R. Pahl

9 3 1 2 7 2 1 9 9

54-1900-001 (6/84)

Add to Blow up list -

2 glycol dimethyl ether
tetraglyme (?.2-1 Kg bottles

2pt Benzene w/ N-Butyl Lithium

Check on disposal request for
CS Abernethy - lab cleanout
Al Scott / last fall

Carbon Disulfide ?

Dimethyl Sulfoxide

9 3 1 2 7 2 2 0 0 0

Battelle
Pacific Northwest Laboratories

RECEIVED
APR 19 1985
R & NS

Project Number PM Potter

Internal Distribution
GR&E Section Mgrs.
EL Kelley
File/lb

Date April 9, 1985

To Distribution

From FO Gladfelder Frank

Subject Peroxide-Forming Chemical Disposal

Ref: Memo, JM Hobbs to Building Manager, dated April 5, 1985, subject as above. (copy attached)

Please review and take necessary actions to satisfy requirements of the attached memo. As noted in the memo Jeene has requested a response no later than April 18. Please direct your response (if any) to her with copy to me.

Thanks in advance for your prompt attention to this request.

FOG:cla

11/18/85

Jeene,
None for Tech. Support Section.
PM Potter
c.c: F.O. Gladfelder
File

9312752201

54-1900-001 (6/84)

Battelle
Pacific Northwest Laboratories

Project Number

Internal Distribution

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs Jeene

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

9 3 1 2 7 2 2 0 0 2

54 1000 001 (6 83)

24-3000-1011 9-591

DON'T SAY IT --- *Write It!*

DATE 4.9.85

TO Jeene Hobbs

FROM Art Bruce

RECEIVED
APR 9 1985
R & NS

Ref. Chemical Disposal

It does not look like I have any peroxide-forming chemicals to be disposed of at this time.

There is a box ~ 2 cubic ft. of unmarked solid chemicals at 320 Bldg that need to be disposed of. The contact is Bob Stubin or Bob Kiddy on L-3605.

9312752203

Battelle
Pacific Northwest Laboratories

RECEIVED
APR 15 1985
R. R. NS

Project Number _____

Internal Distribution
SK Campbell
JS Fruchter
FO Gladfelder
CL Nelson
File
LB

Date April 12, 1985

To Jeene Hobbs

From Debbie Sklarew - Geosciences R&E

Subject Your memo on "Peroxide-Forming Chemical Disposal"

I have the following items in Sigma 5:

ethyl ether	-1-	can (opened) - Rm 1411 - under hood
	-1-	1 gal bottle (unopened) - back dock - Solvent cabinet #1
THF	-2-	1 gal bottles (opened) - Rm 1510 - under hood
	-6-	1 gal bottles (unopened) - Back dock - Solvent cabinet #1

(Key to the solvent cabinet is in Rm 1411 - desk drawer)
Thanks!

DSS/mgs

9 3 1 2 7 2 2 0 4

54-1900-001 (6/84)

Battelle
The Pacific Northwest Laboratories

Project Number

Internal Distribution

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

RECEIVED
APR 10 1985
R & NS

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs Jeene

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slu

Jeene,

None — 324 Bldg. or
Jones.

JK

9 3 1 2 7 0 2 2 0 0 5

Battelle
Pacific Northwest Laboratories

Project Number

Internal Distribution

FG Burton
JA Piatt
DJ Sommer
JMH File/LB

Date April 5, 1985

To PNL Building Managers

From Jeene M. Hobbs Jeene

Subject PEROXIDE-FORMING CHEMICAL DISPOSAL

Rockwell is organizing special disposal for peroxide-forming and unstable chemicals. Please contact your building occupants to determine if they have the following chemicals for disposal: perchloric acid, picric acid, ethyl ether, and tetrahydrofuran.

I need a list of the chemicals by April 18. The list should include the chemical name, quantity, building, room number, contact person, and phone number. Please list the chemical again even if I have been called about it previously.

If you have questions, contact me on 376-1631.

/slw

9312722006

UNSTABLE CHEMICAL DISPOSAL

Chemical	Quantity	Age	Building/Location	Contact & Phone Number

Don -

Back to blowing up chemicals - They haven't yet -

Here's what I have - If RHO calls, move ahead with it.

Please call Gen Davison in PS2. She may have some of these chemicals. She was supposed to call me back.

See attached sheets

Also

Perchloric Acid -

320 Bldg 1 Pt Christi Bauman

331 Rm 103 3 Pt SuMei Le

Ether

E5 1 Pt Deb Sklarew

Call these folks to coordinate if this comes off! Irene

9 3 1 2 7 2 2 0 3 8

Rockwell Hanford Operations
Energy Systems Group
P.O. Box 800
Richland, WA 99352

Rockwell International

RECEIVED
OCT 5 1984
R & NS

October 2, 1984

In reply, refer to Letter R84-3497

Ms. J. M. Hobbs
Laboratory Safety Department
Pacific Northwest Laboratory
Richland, Washington 99352

Dear Ms. Hobbs:

ORGANIC PEROXIDE DISPOSAL

This is to inform you that we are presently coordinating with the Richland Bomb Disposal Squad and other necessary elements to dispose of some potentially explosive organic peroxides which Rockwell Hanford Operations (Rockwell) has on site.

Mr. M. R. Romsos of my staff has informed me that you have a one-pound container of ether which requires disposal. In order to save the Bomb Disposal Squad a trip, we would like to have your ether disposed of during our scheduled pickup.

Mr. Romsos and Mr. G. R. Cox of my staff both wish to express their concern over transporting this material other than by the means described in this correspondence. Since professional personnel and equipment will be available, we strongly suggest they be utilized, and thereby reduce the potential risk to personnel.

Mr. Romsos will be in contact with you when the pickup times are defined. Information from you will be required concerning proper procedures for your facility. If you have any questions on this matter, feel free to contact Mr. Romsos on 373-3948.

Very truly yours,

R. C. Beagley, Manager
Industrial Hygiene & Safety

RDB/MRR:dlk

9 3 1 2 7 5 2 2 0 0 9

NOV 2 1984

PEROXID-FORMING CHEMICAL DISPOSAL REQUEST

By C.S. Abernethy Building No. 331/300Area

Chemical Name	Number of Containers	Container Size	Container Type	Location
Perchloric Acid	1	1 pt	glass Bottle	Room 158

RETURN TO J. M. HOBBS - 3762/300/PNL

9 3 1 2 7 2 2 0 1 0

Battelle
Pacific Northwest Laboratories

Date: 11-14-84

To: Jeene

From: DON SOMMER

① Mark Panther / police dept ready to dispose / blow up your chemicals. He will blow them up later

② Mike Romsos wants you to give him a call at 373-2304 about disposing of some chemicals

9 3 1 2 7 5 2 2 0 1 1

Finish
6/2/86

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

Rockwell International

RECEIVED
HAZARDOUS MATERIAL
SAFETY
MAY 28 1986

In reply, refer to letter R86-2499

FILE 332

MAY 28 1986

Mr. D. L. Lundstrom
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Mr. Lundstrom:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-83

Reference: Chemical Waste Disposal Request 86-009, April 2, 1986, D. L. Lundstrom to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and U. S. Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatability.

9312722012

DISPOSAL ANALYSIS NO. PNL-22-83

THE FOLLOWING ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE. THESE WASTES SHOULD BE DISPOSED OF BY DETONATION. PLEASE CONTACT:

M. R. ROMSOS 373-4032

TO MAKE FURTHER ARRANGEMENTS.

1. Chlorine trioxide	Chromium Trioxide	1 lb
2. Tetrahydrofuran		100 ml

9 5 1 2 7 5 2 2 0 1 3

DETONATION DISPOSAL 3/19/86 R1

CHEM NAME	AMOUNT	CONT. MATERIAL	LOCATION	OWNER	ADDITIONAL NOTES
2,4,6-TRINITRO RESORCINOL	25 GRAMS	PLASTIC	3714 BLDG.	PNL	CONTACT E. MARTIN, EXP LOSIVE
2,4-DINITRO RESORCINOL	70 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN
2,4-DINITROPHENOL	500 GRAMS	PLASTIC	3714 BLDG.	PNL	CONTACT E. MARTIN, EXP LOSIVE YELLOW CHRYSTALS
2,4-DINITROPHENYL HYDRAZINE	125 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN, NO REFERENCE IN RTECS, "EXPLOSIVE?" MARKED ON BOTTLE
ALPHA-NITROSOMETHYLISOBUTYLKE TONE	174 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E.MARTIN, MARK ED EXPLOSIVE ON CONTAINER, NO LISTING IN RTECS OR OTHER MANUALS.
BUTOXYETHANOL	1 QUART	GLASS	325 BLDG.	WHC	WES KNIGHT OWNER
BUTYL CELLUSOLVE	100 MILLILITERS	GLASS	325 BLDG./RM. 312	WHC	APPROX. 5-10 YEARS OLD , IN FLAMMABLE STORAGE CABINET, ETHYLENE GLYCOL MONOBUTYL ETHER
BUTYL ETHANOL	2.5 GAL.	METAL BUCKET	306E BLDG./SHOP	WHC	2-BUTOXYETHANOL, (ETHY LENE GLYCOL MONOBUTYL ETHER), APPROX. 10 YEARS OLD
CARBON TRICHLORIDE	1 POUND	GLASS	326 BLDG./RM. 39B	WHC	AT LEAST 15 YEARS OLD, CONTAINER FULL, ON SHELF, RESEMBLES PIC IC ACID, NOT LISTED IN RTECS
ETHYL ETHER	1 PINT	METAL	SIGMA 5	PNL	
	2 PINTS	METAL	REDOX, BACK DOCK	RHO	MINIMUM 10 YEARS OLD, CHRYSTALIZED
		METAL	3746A	PNL	
HEXANITRODIPHENYLAMINE	70 GRAMS	GLASS	3714 BLDG.	PNL	CONTACT E. MARTIN, POT

DETONATION DISPOSAL 3/19/86 R1

CHEM NAME	AMOUNT	CONT. MATERIAL	LOCATION	OWNER	ADDITIONAL NOTES
					ENTIALLY EXPLOSIVE?, NO INFORMATION LABLE
[illegible] ETHER	1 PINT	METAL	3745B	PML	PML REQUIRED TO FURNIS H JUSTIFICATION, MAY NOT BE [illegible]
[illegible] ACID	100 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E. MARTIN, APP ROX. 20 YEARS OLD, EXPLOSIVE
[illegible]GYL CHLORIDE	300 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E. MARTIN, EXP LOSIVE, IN TWO ALMOST EMPTY CONTAINERS.
[illegible]TRAHYDROFURAN	6-1PINT CONTAINERS	GLASS	3714 BLDG.	PML	E.MARTIN, 20 YEARS OLD , 3/4 FULL
[illegible]ROTOLUENE	100 GRAMS	GLASS	3714 BLDG.	PML	CONTACT E.MARTIN, EXPL OSIVE

Larry Toburen
& McCollock

Done

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

Rockwell International

RECEIVED
HAZARDOUS MATERIAL
JUN 11 1986
ACTION
FILE
ROUTE
OFFICE
FILE
ACTION TO
DATE

JUN 09 1986

In reply, refer to letter R86-2737

Mr. D. L. Lundstrom
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Mr. Lundstrom:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-129

Reference: Chemical Waste Disposal Request Nos. 86-010, 86-026, May 5, 1986, D. L. Lundstrom to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and U. S. Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatability.

9 3 1 2 7 2 2 0 1 6

DISPOSAL ANALYSIS NO. PNL-22-129

- Each container must be legibly numbered on both the top and sides, using the manifest number and a unique container number, e.g., PNL-22-129-1.
- The weight of the outer container, if over 110 pounds, must be marked on the container.
- Packagings containing liquids must be marked "This End Up", with an arrow.
- In accordance with 49 CFR 172.301 and 172.304, all markings must be legible, durable, and in a color which contrasts with the container.

NONHAZARDOUS WASTE

The following items are not hazardous wastes as defined in WAC 173-303, and may be disposed of to a drain:

1.	Phenylcyclohexane	(86-010, #3)	250 ml
2.	Methylaniline	(86-026, #3)	500 g
3.	Diphenyl methane	(86-010, #7)	0.96 liter
4.	Ethyl naphthalene	(86-010, #8)	12 @ 10 g

THE FOLLOWING IS HAZARDOUS WASTE WHICH IS UNSTABLE OR EXPLOSIVE.

This waste should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

1. Boron trifluoride etherate (86-026, #4) 1 kg

WC01
D001
D003
(EHW)

-1PABS
8/25/87

9 3 1 2 7 5 2 2 0 1 7

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

Rockwell International

In reply, refer to letter

Received 6/19/86 [illegible]

Ms. J. M. Hobbs
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Ms. Hobbs:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-176

Reference: Chemical Waste Disposal Request No. 86-040, June 5, 1986, J. M. Hobbs to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with state of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatability.

9 3 1 2 7 2 2 0 1 3

DISPOSAL ANALYSIS NO. PNL-22-176

NONHAZARDOUS WASTE

The following items are not hazardous wastes as defined in WAC 173.303, and may be sent to the Central Landfill Trash Trench for disposal. Please package these wastes so they are securely contained for transport and disposal.

NO MANIFEST IS REQUIRED FOR THESE ITEMS.

1. Ferric Oxide: 0.45 kg

UNSTABLE OR EXPLOSIVE WASTES

The following are hazardous wastes which are unstable or explosive. These wastes should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

1. Carbon Disulfide: Five 500-ml bottles (1.0 kg)
   P022
   D003
   D001
   (EHW)

9 3 1 2 7 5 2 2 0 1 9

Enclosure II

332 BUILDING (OUTSIDE 300 AREA)

Tetrahydrofuran	100 ml	glass	
Tetrahydrofuran	2.0 kg	glass	2-1 gallon
Tetrahydrofuran	4 kg	glass	
Triethylborane -1 M solution in hexane	0.5 kg	glass in metal	
Lithium hydride	0.23 kg	glass	
Acrolein	0.4 kg	glass	
Hydrazine	1 kg	crate	
Aluminum Chloride	0.45 kg	glass	
Unsymetrical dimethyl hydrazine	0.01 kg	glass	
n-nitrobenzoyl chloride	0.1 kg	glass	
Sodium peroxide	0.34 kg	metal	3 containers
Benzene/butyl lithium solution	0.9 kg	glass	
Waste solvent hexane/benzene/butyl lithium/ tetrahydrofuran	1 kg	glass	
Chromium metal powder	1 lb	glass	
Organic mixture: 40 % toluene 20 % ether 5 % benzene 5% ethyl acetate 30 % petroleum ether	4 kg	glass	
Organic mixture: 50 % heptane 50 % di-ethyl ether	4 kg	glass	
Organic mixture: % ethyl ether % allyl magnesium bromide	1 kg	glass	

9 3 1 2 7 2 2 0 2 0

332 BUILDING (CONTINUED)			
)rganic mixture 20 % benzene 20 % ethyl acetate 10 % tetrahydrofuran 10 % toluene 10 % ether 1 % hydrogen sulfide 29 % methanol	4 kg	glass	
LSL-II BUILDING (3000 AREA)			
Ethyl ether	4 pints	metal	at least 9 years old
Ethyl ether	6 gallons	glass	age unknown
Ethyl ether	1 gallon	glass	unopened, age unknown
Picric acid	5 grams	glass	re-wetted crystals
Picric acid	1 lb	glass	dry crystals
SIGMA 5 BUILDING (3000 AREA)			
:hyl ether	1 pint	metal	unopened, age unknown
RTL BUILDING (3000 AREA)			
Isopropyl ether	1 kg	glass	at least 2 1/2 yrs old, partially empty
325 BUILDING (300 AREA)			
Butoxyethanol	1 quart	glass	age unknown
Butyl Cellusolve	100 ml	glass	5-10 years old
326 BUILDINGS (300 AREA)			
Carbon Trichloride	1 lb	glass	15 years old, resembles picric acid
306E BUILDING (300 AREA)			
:yl Ethanol	2.5 gal	Metal	greater than 10 years old
271-S BUILDING (200 W AREA)			
Ethyl Ether	2 gals	[illegible]	[illegible]

9 3 1 2 7 5 2 2 0 2 1

3714 BUILDING (INSIDE 308 PROTECTED AREA, INSIDE 300 AREA)

Picric Acid	100 grams	glass	approximately 20 years old, explosive
Picryl Chloride	300 grams	glass	explosive, in two almost empty containers
Tetrahydrofuran	6-1 pint cont.	glass	20 years old, 3/4 full
Trinitrotoluene	100 grams	glass	explosive
4,6 - Trinitro Resorcinol	25 grams	plastic	explosive
2,4 - Dinitro Resorcinol	70 grams	glass	
2,4 - Dinitrophenol	500 grams	plastic	explosive, yellow crystals
2,4 - dinitrophenyl hydrazine	125 grams	glass	explosive"? marked on bottle
!pha-nitrosomethylisobutylketone	174 grams	glass	marked explosive on container
Hexanitrodiphenylamine	70 grams	glass	potentially explosive?

329 BUILDING (INSIDE 300 AREA)

Picric Acid	100 g	glass	old and dry

3745B BUILDING (INSIDE 300 AREA)

Phenyl ether	1 pint	metal	age unknown

3746A BUILDING (INSIDE 300 AREA)

Ethyl Ether	2 pints	metal	age unknown

9 3 1 2 7 2 2 2 0 2 2

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
Ethyl Ether	3	12K	1 gal. glass	PF	329 Bldg.
Isopropyl Ether	6	4K	1 pt. glass	PF	331 Bldg.
Picric Acid	1	.2K	1 pt. glass	PF	331 Bldg.
Ethyl Ether	6	4K	1 pt. metal	PF	331 Bldg.

9 3 1 2 7 5 2 2 0 2 3

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

Rockwell International

RECEIVED
HAZARDOUS MATERIAL
SAFETY
SEP 1 2 1986

ACTION
ROUTE
XEROX
TICKLE
FILE
RETURN TO
TOSS

SEP 9 3 1986

In reply, refer to letter 886-4221

Mr. D. L. Lundstrom
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

Dear Mr. Lundstrom:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-251

Reference: Chemical Waste Disposal Request 86-058, June 19, 1986, D. L. Lundstrom to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatability.

9 3 1 2 7 2 2 0 2 4

DISPOSAL ANALYSIS NO. PNL-22-251

THE FOLLOWING ITEMS ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE. THESE WASTES SHOULD BE DISPOSED BY DETONATION. PLEASE CONTACT M. R. ROMSOS ON 373-4032 TO MAKE ARRANGEMENTS.

Item Number	Waste		Quantity/Container/Amount		
1 (D001,F001, WT02,WP01, WC01,F003)	35.0%	methanol	1	glass bottle 1-gal	3.0 kg
	10.0%	diethyl ether			
	17.0%	tetrahydrofuran			
	14.0%	carbon tetrachloride			
	1.0%	p-Dioxane			
	22.0%	N,N-dimethylformamide			
	1.0%	p-xyloquinone			
5 (WP01,F001, F005,WT01, WC01)	2.0%	water	1	glass bottle 1-gal	3.0 kg
	30.0%	acetone			
	5.0%	hexane or heptane			
	3.0%	ethyl acetate			
	14.0%	tetrahydrofuran			
	4.0%	carbon tetrachloride			
	5.0%	benzene			
	4.0%	p-dioxane			
	3.0%	toluene			
	1.0%	methyl isobutenyl ketone			
	5.0%	2-furaldehyde			
	3.0%	2,4-dimethyl-3-dioxolane-2-methanol			
	4.0%	N,N-dimethylacetamide			
	1.0%	chlorotoluene			
	15.0%	decahydronaphthalenes			
	1.0%	tetrahydronaphthalene			
7 (D001,WP01, F003,F005, WT02)	25.0%	methanol	1	glass bottle 1-gal	3.0 kg
	25.0%	tetrahydrofuran			
	25.0%	isooctane			
	10.0%	methyl phenyl ethanone			
	8.0%	toluene			
	3.0%	2-ethyl-5-methyl-2-dioxane			
	4.0%	benzene propanoyl chloride plus tetramethylbenzene			

DISPOSAL ANALYSIS NO. PNL-22-251

Item Number	Waste		Quantity/Container/Amount		
11 (F003, F005, WT02, WP01, WC01, D001)	45.0%	methanol	1	glass bottle 1-gal	3.0 kg
	0.5%	acetone			
	6.0%	C_6-C_8 hydrocarbons			
	29.0%	tetrahydrofuran			
	1.0%	benzene			
	4.0%	1-chloro-2-propanol			
	13.0%	toluene			
	1.0%	methyl phosphate			
	0.5%	2-ethyl-5-methyl-1,4-dioxane			
12 (D001, WP01, WT01, F005, F003, F001, WC01)	50.0%	acetone	1	glass bottle 1-gal	3.0 kg
	10.0%	methanol			
	5.0%	carbon tetrachloride			
	5.0%	benzene			
	10.0%	heptane			
	10.0%	toluene			
	3.0%	pyrridine borane			
	3.0%	N,N-dimethyl acetamide			
	2.0%	methyl isobutenyl ketone			
	2.0%	pentoxone			

9 3 1 2 7 0 2 2 0 2 6

9 3 1 2 7 5 2 2 0 2 7

85-001 [illegible] ~ 1/85

— [illegible] ~ 1/85
Scheele

85-002 Perchloric acid ~ 1/85
Burton

— Elovich Bobi ~ 7/85

9 3 1 2 7 2 0 0 2 8

CHEMICAL DESIGNATION

OWNER	CHEM NAME	LOCATION	AMOUNT	CONT. SIZE
1 PNL	PERCHLORIC ACID	RM 122/622R BLDG.	500 MILLILITERS	1 PINT
1 WHC	BUTYL ETHANOL	SHOP/306 E BLDG.	2.5 GAL.	5 GAL.
10PNL	2,4-DINITRO RESORCINOL	3714 BLDG.	70 GRAMS	1 PINT
11PNL	PICRYL CHLORIDE	3714 BLDG.	300 GRAMS	1 PINT
12PNL	PICRIC ACID	3714 BLDG.	100 GRAMS	1 PINT
13PNL	CARBON DISULFIDE	332	3=1 GAL. CONTAINERS	1 GAL.
14PNL	BENZENE WITH N-BUTYL LITHIUM	332	2-1 PT. CONTAINERS	?
15PNL	GLYCOL DIMETHYL ETHER	332	2=1 PINT CONTAINERS	1 PINT
16PNL	PERCHLORIC ACID	332 BLDG.	1 PT.	1 PINT
17PNL	PERCHLORIC ACID	LSL-II/RM. 1420	2=1.5 LB. CONTAINERS	1.5 LB.
18PNL	PERCHLORIC ACID	320 BLDG./OUTSIDE ACID CAB.	500 ML.	1 PINT
19PNL	TETRAHYDROFURAN	E5/BACK DOCK/SOLVENT CAB. 1	6=1 GAL. BOTTLES	1 GAL.
2 PNL	PERCHLORIC ACID	RM 122/622R BLDG.	200 MILLILITERS	1 PINT
2 WHC	BUTYL CELLUSOLVE	RM. 312/325 BLDG.	100 MILLILITERS	1 PT.
20PNL	TETRAHYDROFURAN	E5/RM. 1510/UNDER HOOD	2-1 GAL. BOTTLES	1 GAL.
21PNL	ETHYL ETHER	E5/BACK DOCK/SOLVENT CAB. 1	1 GAL.	1 GAL.
22PNL	ETHYL ETHER	E5/RM 1411/UNDER HOOD	1 POUND	1 POUND
23PNL	PERCHLORIC ACID	331 BLDG./RM. 103	3=1 PINT CONTAINERS (1/3 FULL)	1 PINT
24PNL	PERCHLORIC ACID	PSL BLDG./RM. 605	3/4 PINT	1 PINT
3 PNL	TETRAHYDROFURAN	3714 BLDG.	6=1PINT CONTAINERS	1 PINT
3 WHC	CARBON TRICHLORIDE	RM.39B/326 BLDG.	1 POUND	1 PT.
4 PNL	ALPHA-NITROSOMETHYLISOBUTYLKETONE	3714 BLDG.	174 GRAMS	?
4 WHC	ETHYL ETHER	309 BLDG.	1/4 PT.	1 PINT
5 PNL	2,4,6-TRINITRO RESORCINOL	3714 BLDG.	25 GRAMS	?
6 PNL	2,4-DINITROPHENOL	3714 BLDG.	500 GRAMS	?
7 PNL	TRINITROTOLUENE	3714 BLDG.	100 GRAMS	1 PINT
8 PNL	2,4-DINITROPHENYL HYDRAZINE	3714 BLDG.	125 GRAMS	?
9 PNL	HEXANITRODIPHENYLAMINE	3714 BLDG.	70 GRAMS	?

Jeannie, The Highlighted ones are yours, we might be rescheduling for the 29th. I'll be in touch.

Mike

Add 1pt ether 331 Rm 104 open

HAZARDOUS MATERIAL
OCT 23 1985
ACTION
ROUTE
XEROX
TICKLE
FILE
RETURN TO
TO:

Battelle
Pacific Northwest Laboratories

Project Number _____

Internal Distribution
JH Choate
FO Gladfelder
SC Hawley
ER Job
SW Li
EC Martin
MJ Pueschner
GL Roberts
DS Sklarew
JMH/File/LB

Date October 24, 1985

To Distribution

From Jeene Hobbs Jeene

Subject Disposal of Peroxide Forming Chemicals

Arrangements have finally been made to dispose of your potentially explosive chemicals. We will be collecting them with assistance from the City of Richland Bomb Squad.

The collection date is Wednesday, October 30, after regular business hours. I will come around either Tuesday or Wednesday to make sure that I can still find the chemicals.

If you have any questions, please call me on 376-1631.

JMH:jl

Copy to Ramsos
4/29/85

UNSTABLE CHEMICAL DISPOSAL

Chemical	Quantity	Age	Building/Location	Contact & Phone Number
ethyl ether opened	1# can	?	Σ5 - Rm 1911 Under hood	Deb Sklarew
ethyl ether unopened	1 gal bottle	?	Σ5 back dock Solvent cabinet #1	Deb Sklarew Key to solvent cabinet in Rm 11 desk drawer
Tetrahydrofuran opened	2 - 1gal bottles	?	Σ5 - Rm 1510 Under hood	Deb Sklarew
Tetrahydrofuran unopened	6 - 1gal bottles	?	Σ5 back dock Solvent cabinet #1	Deb Sklarew
~~Perchloric Acid~~	~~500ml~~	~~>5yr~~	~~320 Bldg - Acid Cabinet Outside~~	~~Bob Kiddy 6-3605~~
Perchloric Acid 70%	2-1.5#	>1yr	LSL-II, Rm 1420 Worth hood	Fred Burton 5-2031
Perchloric Acid	1-1pt	>2yr	332	Jeene Hobbs 6-1631
tetraglyme (glycol dimethyl ether)	2-1kg	>2yr	332	Jeene Hobbs 6-1631
Benzene w/N-butyl lithium	2-1pt	>1yr	332	Jeene Hobbs 6-1631

UNSTABLE CHEMICAL DISPOSAL

Chemical	Quantity	Age	Building/Location	Contact & Phone Number
Carbon Disulfide	2-1gal	>1yr	332	Jeene Hobbs 6-1631
Perchloric	~~3~~ 1pt		PSL	
Perchloric	3-1pt		331	Shu Mei Li

94-3000-10119-591

DON'T SAY IT --- *Write It!*

DATE 5/8/85

TO Jeene Hobbs

FROM Dick Lee (375-3830)
2400 Stevens

Chemical	quantity	bldg	Rm	
Perchloric Acid	~200ml	622R	122	
" "	~500ml	"	122	← unopened glass bulb

Sorry for the late response to your memo. I've been out of town.

Dick Lee

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

931227 220032

4/16/85

RECEIVED
APR 30 1985
R & NS

MIKE —

I HAVE — (for disposal) Explosives

100 g	Picric Acid (10-20% water transportation	>300°C percussion
300 g	picryl chloride	?
70 g	2.4 di nitro resorcinol	strong Reactant
70 g	hexa nitro diphenylamine	HAS TENDENCY TO Explode
300 g	2,4 di nitro diphenylamine	(instant)
125 g	2.4-dinitro phenyl hydrazine (30% moisture)	Bottle after explos
100 g	Trinitrotoluene	explodes by percussion w/ [illegible]
500 g	2.4-dinitrophenol	TOXIC Absorbs through skin
25 g	2,4,6-Trinitro resorcinol	deflagrates on rapid heating
174 g	α-nitrosomethylisobutyl Ketone	?

6 jars Tetrahydrofuran

3714 Bldg — E C Martin 6-3578

I can't get a hold of Jeane — maybe you can tell her to contact me.

Thanks

ECM

3714 BUILDING (INSIDE 308 PROTECTED AREA, INSIDE 300 AREA)

Picric Acid	100 grams	glass	approximately 20 years old, explosive
Picryl Chloride	300 grams	glass	explosive, in two almost empty containers
Tetrahydrofuran	6-1pint cont.	glass	20 years old, 3/4 full
Trinitrotoluene	100 grams	glass	explosive
4,6-Trinitro Resorcinol	25 grams	plastic	explosive
2,4-Dinitro Resorcinol	70 grams	glass	
2,4-Dinitrophenol	500 grams	plastic	explosive yellow crystals
2,4-dinitrophenyl hydrazine	125 grams	glass	explosive"? marked on bottle
Alpha-nitrosomethylisobutylketone	174 grams	glass	marked explosive on container
Hexanitrodiphenylamine	70 grams	glass	potentially explosive?,

---

329 BUILDING (INSIDE 300 AREA)

Picric Acid	20 g	glass	old and dry
Alumina & Picric Acid	150 g	1 gal	water cover

3745B BUILDING (INSIDE 300 AREA)

Phenyl ether	1 pint	glass	age unknown

3746A BUILDING (INSIDE 300 AREA)

Ethyl Ether	2 pints	metal	age unknown

9 3 1 2 7 2 2 0 3 4

332 Building (OUTSIDE 300 AREA)

Tetrahydrofuran	100 ml		glass
Tetrahydrofuran	3.0 kg	glass	3-1 gallon
Tetrahydrofuran	4 l		glass
Triethylborane -1 M solution in hexane	0.5 kg	glass in metal	
Lithium hydride	0.23 kg		glass
Acrolein each	0.4 kg	glass	in metal 3 items 100g
Hydrazine	1 kg		crate
Aluminum Chloride	0.45 kg		glass
Unsymetrical dimethyl hydrazine	0.01 kg		glass
p-nitrobenzoyl chloride	0.1 kg		glass
Sodium peroxide	0.34 kg	metal	3 containers
Benzene/butyl lithium solution	0.9 kg		glass
Waste solvent hexane/benzene/butyl lithium/ tetrahydrofuran	1 kg		glass
Chromium metal powder	1 lb		glass
Organic mixture: 40% toluene 20% ether 5% benzene 5% ethyl acetate 30% petroleum ether	4 l		glass
Organic mixture: 50% heptane 50% di-ethyl ether	4 kg		glass
Organic mixture: 78% ethyl ether 22% allyl magnesium bromide	1 kg		glass

Alumimium Chloride	1 4 oz	
Hydrazine	1 kg	crate
Organic mixture: 20% benzene 20% ethyl acetate 10% tetrahydrofuran 10% toluene 10% ether 1% hydrogen sulfide 29% methanol	4 kg	glass
Organic Mixture: 85% Hexane 5% Ether 10% Ethylacetate	1 gal	glass
Organic Mixture: 30% Et_2O 10% H_2O 10% MeOH 40% IPA 10% Pentane	1 gal	glass
40% Organic Mixture: 25% iso-octane 20% t-Butyl methyl ether 10% ether 5% Acetone	1 gal	1 glass
80% Organic Mixture: 5% methylene chlorite 5% acetone 5% Benzene 5% acetonitrile 5% ether	1 gal	glass
Organic Mixture 10% Dichlormethone 75% Hexane 5% Ether 10% Ethyl Acetate	1 gal	glass

9 3 1 2 7 2 2 0 3 6

332 Building (contd)

Organic Mixture: 50% Hexane 10% Acetone 10% Ether 20% Benzene 10% THF	1 gal	glass
carbon sulfide	5-1#	glass
Boron trifluoride etherate	1#	glass
Butyl lithium waste	1 l	glass

LSL - II BUILDING (3000 AREA)

Ethyl ether	5 pints	metal	at least 9 yrs old
Ethyl ether	8 liters	glass	age unknown
Ethyl ether	1 gallon	glass	unopened, age unknown
Picric acid	5 grams	glass	re-wetted crystals
Picric acid	1 lb	glass	dry crystall
Picric acid	1 lb	glass	dry crystals

SIGMA 5 BUILDING (3000 AREA)

Ethyl ether	1 pint	metal	unopened, age unknown

RTL BUILDING (3000 AREA)

Isopropyl	1 kg	glass	at least 2 1/2 yrs old, partially empty

Shipped 6/11/86

→ JMH

Rockwell Hanford Operations
P.O. Box 800
Richland, WA 99352

Rockwell International

In reply, refer to letter R86-2632

3, 2, 1 [illegible]

Ms. J. M. Hobbs
Pacific Northwest Laboratory
Post Office Box 999
Richland, Washington 99352

TNL-22-82-2
Waste flam. liq

Dear Ms. Hobbs:

CHEMICAL WASTE DISPOSAL ANALYSIS NO. PNL-22-125

Reference: Chemical Waste Disposal Requests 86-019, 86-020, 86-027, 86-028 and 86-029, April 30, 1986, J. M. Hobbs to Solid Waste Processing and Disposal Unit

The Rockwell Hanford Operations' Solid Waste Processing and Disposal (SWP&D) Unit has completed a waste disposal analysis for wastes identified in the reference. Instructions for waste packaging and disposal are:

General

All hazardous wastes must be packaged and transported according to Washington State Regulations WAC 173-303 and U. S. Department of Transportation (DOT) Regulations 49 CFR. Improperly packaged wastes will not be accepted by site disposal facility personnel and will be returned to you for corrections. These circumstances should, however, be prevented by the pre-shipment inspection made by our Unit personnel.

Preparation for Shipment

Wastes must be packaged, labeled and marked by the generator according to the instructions given in the attached disposal analysis. The instructions must comply with State of Washington and DOT regulations. Please note that markings must be legible, durable, and in a color which contrasts with the container. Labels are available as store stock items.

Inspection and Manifests

When the waste has been properly packaged, SWP&D Unit personnel will make a pre-shipment inspection to verify compliance with the packaging instructions. Properly completed Uniform Hazardous Waste Manifest(s) will be delivered and initiated by the SWP&D Unit representative upon satisfactory inspection. More than one manifest may be required, depending on shipping destinations and waste compatability.

DISPOSAL ANALYSIS NO. PNL-22-125

THE FOLLOWING ARE HAZARDOUS WASTES WHICH ARE UNSTABLE OR EXPLOSIVE.

These wastes should be disposed by detonation. Please contact M. R. Romsos on 373-4032 to make further arrangements.

1.	Benzene/butyl lithium solution	(86-028, #7)	1 qt (0.9 kg) — HPADS
2.	Waste solvent: hexane/benzene/butyl lithium/ tetrahydrofuran	(86-019, #8)	1 qt (1 kg) — HPAD
3.	Tetrahydrofuran	(86-019, #38)	1 gal (4 kg) HPADS
4.	Chromium metal powder	(86-027, #23)	1 lb
5.	Organic mixture: 40% toluene 20% ether 5% benzene 5% ethyl acetate 30% petroleum ether	(86-028, #2)	1 gal (4 kg) 2W
6.	Organic mixture: 50% heptane 50% di-ethyl ether	(86-020, #30)	1 gal (4 kg) 2W
7.	Organic mixture: 78% ethyl ether 22% allyl magnesium bromide	(86-019, #7)	1 liter (1 kg) 2W
8.	Organic mixture: 20% benzene 20% ethyl acetate 10% tetrahydrofuran 10% toluene 10% ether 1% hydrogen sulfide 29% methanol	(86-020, #18)	1 gal (4 kg) 2W

Revision to ENCLOSURE II (July 22, 1987 Letter)

CHEMICALS TO BE DETONATED IN ADDITION TO ENCLOSURE II LIST
August 25, 1987

Chemical Name	Quantity	Total Amount	Type of Container	Status (*)	Location (Bldg.)
Ether	1	1 lb	Can	PF	331A
Ether	3	3 lb	Can	F	331
Perchloric Acid	4	1 L	Glass	3 F 1 PF	332
Sodium Sulfide	1	1 lb	Glass	PF	332
Sodium Peroxide	2	2 lb	Glass	PF	332
Tertiary butyl amine borane	2	2 oz	Glass	F	332
Organic Mixture 95% tetrahydrofuran 5% toluene	1	4 L	Glass	F	332
Organic Mixture 98% tetrahydrofuran 2% tryfloralin	1	3.8 kg	Glass	F	332
Organic Mixture 93% tetrahydrofuran 10% methanol 3% H2 O 4% tryfloralin	1	3.8 kg	Glass	F	332
Black Powder	1	1 lb	Metal	F	Patrol Academy

* F Full container, has not been opened.
PF Partially full container, has been opened.

9 3 1 2 7 2 2 0 4 0

August 5

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
Tetrahyrofuran	1	3.8K	glass	F	331 Bldg.
1,4 - Dioxane	1	1K	glass	F	331 Bldg.
Boron trifluoride ether complex	1	.4K	glass	PF	332 Bldg
1,4 - Dioxane	1	.5K	glass	F	332 Bldg.
Tetrahyrofuran	1	.1K	glass	PF	332 Bldg.
Hydrazine monohydrate	1	.5K	glass	F	332 Bldg.
Boron trifluoride methanol complex	1	1K	glass	PF	332 Bldg.
Butyllithium/ benzene mixture (25% / 75%)	1	.2K	glass	F	332 Bldg.
Boron trifluoride/ methanol mixture (14% / 86%)	1	.05K	glass	F	332 Bldg.
Boron trifluoride ether complex	1	.1K	glass	PF	332 Bldg.
2,4 Dinitrophenyl hydrazine	1	.025K	plastic	F	332 Bldg.
Allyl ether (100%)	1	.0005K	glass	PF	332 Bldg.
Triethyl aluminum	1	.3K	metal	PF	332 Bldg.
Naphthacene	1	.003K	glass	PF	332 Bldg.
2-Methylfuran (100%)	1	.0005K	glass	PF	332 Bldg.

DON'T SAY IT -- WRITE IT!!

June 23, 1988

TO: Those Listed FROM: G. G. Meade

cc: J. L. Davidson - DOE-RL/A5-55
R. L. Nelson - DOE-RL/A5-55
L. G. Musen - DOE-RL/A5-55
GGM-File/lb

WESTINGHOUSE HANFORD COMPANY DETONATION OF EXPLOSIVE CHEMICALS SCHEDULED FOR JUNE 21, 1988

Letter #8853769 from R. E. Peterson to J. R. Patterson of Department of Energy - Richland Operations Office (DOE-RL), Safety and Environment Division requested approval of the detonation of certain explosive chemicals scheduled for June 21, 1988. The activity was approved by DOE on June 14, 1988. Pacific Northwest Laboratory requested that two additional containers of explosive chemicals be added to the detonation inventory. They are:

- 1 pint-size container of perchloric acid about 1/4 full - obviously old.
- 1 pint-size container of ether about 1/2 full - obviously old.

After a phone consultation with Mr. J. L. Davidson of DOE-RL, Safety and Environment Division, he approved the addition of the two containers listed above to the inventory of chemicals to be detonated.

This DSI serves to modify Enclosure II of Letter 8853769. This DSI should be attached to the letter.

Distribution

J. R. Bell	R3-60	G. G. Meade	R3-54
G. M. Christensen	R2-30	J. W. Olson	R1-51
H. F. Daugherty	R2-28	R. E. Peterson	R2-30
B. G. Essary	SO-46	M. R. Romsos	R1-51
D. E. Good	SO-97	E. L. Stairet	SO-46
D. G. Harlow	R2-01	S. A. Wever	B3-04
W. M. Jacobi	B3-01	D. D. Wodrich	R2-23
D. W. Lindsey	R1-51	D. L. Wegener	X6-18

tat

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

9 3 1 2 7 2 2 0 4 2

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
1,4 - DIOXANE	5	2,500 ml.	glass/500 ml.	PF	100N
Ethyl Ether	1	3,000 ml.	glass/1 gallon	PF	332
perchloric	1/4 pint	~~et~~	PNL		
Ethyl Ether	1/2 pint		PNL		
picryl chloride	-	up			
picric acid		1 ~~quart~~ litre jar			

9 3 4 2 7 5 2 2 0 4 3

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
Lithium Triethylborohydride (PNL-24-556)	1	0.9 Kg	1 quart	F	332
Ethyl Ether (PNL-24-737)	3	1.5 Kg	1 pint	F	332
Ethyl Ether	4	10.8 Kg	4 liter	F	332
2,2′,4,4′,6,6′-hexanitrodiphenylamine	1	0.05 Kg	4 ounce	PF	332
Picryl Chloride (PNL-24-764)	1	0.025 Kg	25 grams	F	332
Dioxane (PNL-24-764)	1	0.5 Kg	500 grams	F	332

9 3 1 2 7 0 2 2 0 4 4

DISPOSAL ANALYSIS NO. PNL-24-737

REACTIVE CHEMICAL

The following chemical has been determined to be reactive and shall NOT be shipped to the 616 Nonradioactive Dangerous Waste Storage Facility.

Item #1290 (3 cans of ethyl ether, 1 pound each)

Please contact M. R. Romsos on 373-4032 to discuss a possible direct offsite shipment of this waste or onsite detonation.

DISPOSAL ANALYSIS NO. PNL-24-764

REACTIVE WASTE

The following item is considered to be explosive and cannot be shipped off-site. Please contact M. R. Romsos on 373-4032 to make arrangements for on-site detonation.

#1517	picryl chloride	1	glass	25g	.025 K
#1340	dioxane	1	glass	500g	.5 K

9 3 1 2 7 2 2 0 4 6

Memo to Mike Romsos
from Kathy Poston
Re: items for detonation for December detonation

The following items have either been designated for detonation by Westinghouse, or have characteristics which make them good candidates for detonation:

Item	Number of containers	Chemical	Quantity
1	1-1 Kg	Lithium Triethylborohydride	.9 Kg
2	3-1 Pint	Ethyl Ether	1.5 Kg
3	4-4 Liter	Ethyl Ether	10.8 Kg
4	4-oz	2,2',4,4',6,6'-hexanitrodiphenylamine	0.05 Kg

Item numbers 1 and 2 have been designated by Westinghouse for detonation, item 3 is at least five years old, and item 4 is very old, and shock sensitive, used as a booster explosive. If you have any questions, give me a call at 376-3752.

Thanks, Kathy

Kathy

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
~~Lithium Triethylborohydride (PNL-24-556)~~	~~1~~	~~0.9 Kg~~	~~1 quart~~	~~F~~	~~332~~
~~Ethyl Ether (PNL-24-737)~~	~~7~~	~~1.5 Kg~~	~~1 pint~~	~~F~~	~~332~~
~~Ethyl Ether~~	~~4~~	~~10.8 Kg~~	~~4 liter~~	~~F~~	~~332~~
~~2,2',4,4',6,6' hexanitrodiphenylamine~~	~~1~~	~~0.05 Kg~~	~~4 ounce~~	~~PF~~	~~332~~
~~Picryl Chloride (PNL-24-764)~~	~~1~~	~~0.025 Kg~~	~~25 grams~~	~~F~~	~~332~~
~~Diexane (PNL-24-764)~~	~~1~~	~~0.5 Kg~~	~~500 grams~~	~~F~~	~~332~~
2,4 Dinitrophenyl-hydrazine	1	402	402	F	331

9 3 1 2 7 2 2 0 4 8

Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support Unit 13841-89-010
Phone: 3-3516 2750E/A119/200E R1-51
Date: February 22, 1989
Subject: GENERATOR LOGBOOK NUMBER 89-013, SITE HAZARDOUS WASTE ENGINEERING SUPPORT UNIT LOGBOOK NUMBER PNL-25-114

To: K. A. Poston P7-68

cc: M. R. Romsos R2-82
RLG: File/LB

The following items are to be detonated on site:

Item #	Containers	Total wt.	Chemical	Waste Codes
2053	2 ea 25 g, 5 ea 4 oz	.2 K	2,4-dinitrophenylhydrazine	D003 WT02
2054	8 ea 1 pt, 1 ea 1 oz glass	7 K	perchloric acid (70%)	WT02 D001 D002 D003
2055	1 ea 1 qt metal	1 K	ethyl ether, anhydrous	U117 D003
2056	2 ea 1 pt cardboard	.45 K	benzoyl peroxide	D001 D003
2057	2 ea 1 gal glass	7.6 K	tetrahydrofuran	U213 WT02 D001 D003
2058	1 ea 1 pt, 1 ea 1 gal, glass	3 K	dioxane	U108 WT01 WC01 D001 D003
2059	1 ea 200 g glass inside lead box	200 g	2,4,6,2',4',6'-hexanitrodiphenylamine	D003

If you have any questions or concerns on the subject, please contact me on 3-3516.

R. L. Granberg
R. L. Granberg
Technician

cmc

SPOSAL ANALYSIS NO. PNL-25-054

SHOCK SENSITIVE/EXPLOSIVE

The following waste is shock sensitive and must be disposed of by contacting M. R. Romsos on 373-4032.

#1928	Hydrazine, monohydrate	2	1 qt glass	.8 K

9 3 1 2 7 0 2 2 0 5 0

OSAL ANALYSIS NO. PNL-24-878

SHOCK SENSITIVE

Waste listed below shall be disposed of by contacting M. R. Romsos on 373-4032, for possible onsite detonation or direct offsite shipment.

#1691	ethyl ether, anhydrous	4, 1 gal glass containers	10.6 K
#1705	sodium sulfide	4, 2 Kg plastic containers	8 K
#1706	tetrahydrofuran	2, 500 ml glass	1 K
#1719	2,2',4,4,6,6' hexanitro-diphenylamine	1, 4 oz glass	0.05 K

WATER REACTIVE

Waste listed below is water reactive and shall be stored at the generating facility. Contact M. R. Romsos on 373-4032 to arrange for direct offsite shipment.

#1718	waste calcium carbide	2, metal 5 lb cans	4.5 K

PNL-25-209 9 3 1 2 7 2 2 0 5 2

Complete unsh. arts and forward to:
Hazardous Waste Unit
2750E/A113/200E
Westinghouse

CHEMICAL WASTE DI. SAL REQUEST

Manifest No.

Generator Logbook No. 89-028

Disposal Analysis Distribution*
1. Generator 4. _____
2. H.W.U. 5. _____
3. _____ 6. _____
*May be used by generator as needed.

Requested By	Telephone No.	Address	Company
Glenn Thornton	6-7688	P7-68	PNL

Signature/Date: Glenn Thornton 3/16/89

Accumulation Date: 3/16/89

WASTE DESCRIPTION (For additional items, continue on the back of this form)

A Item No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Waste Status	L Container Status	
Example 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% In Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH < 2 Flash point > 200 °F	C	O	F	
Example 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF	
Example 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0' < 1 ppm	Liquid, pH = 8.2 Flash Point > 200 °F	None	U	MT	
2295	9	1 pt	Glass	4.5 Kg	1,4-Dioxane	> 6 years	100	Liquid	E	O	PF	332
2296	1	1/2 gal	glass	1 kg	p-Dioxane	Unknown age	100	liquid	E	O	PF	332
2298	~~2~~ 1	1 gal	glass	3.8 kg	Tetrahydrofuran	Tetrahydrofuran unknown age	100	liquid	E	O	F	332
2297	~~1~~ 2	1 pt	Metal Can	2 kg	Nitrocellulose Isopropyl Alcohol	Nitrocellulose Isopropyl Alcohol	>70% <30%	Solid Possibly Evaporated	E	O	F	332
2299	1	1 qt	glass	5 Kg	n-Butyl Ether	Age unknown	100	liquid	E	O	F	

INSTRUCTIONS

Accumulation Date – List the accumulation date of the oldest waste

Column A – Item Number – Item number for each unique waste.

Column B – Number of Containers – Number of containers of a unique waste to be disposed

Column C – Container Size – Size of containers specified in Column B. If multiple container sizes, specify number and size of each

Column D – Container Description – Specify container's DOT specification If non-DOT container or unknown, specify type, e g steel drum

Column E – Total Waste Quantity – Total waste quantity (in kilograms only) of each unique waste to be disposed

Column F – Waste Description – Specify trade name or general description of each unique waste If waste material is a paint, specify color for evaluation of pigments.

Column G – Chemical Components – List all organic and inorganic components of the unique waste using specific chemical names Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste

Column H – Weight (%) – For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.

Column I – Physical Properties – Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.

Column J – Hazards – Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).

Column K – Waste Status – Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).

Column L – Container Status – Indicate whether container is: Full (F), Partially Full (PF), Empty (< 1 in. in 55 Gal Drums) (MT), Triple Rinsed (TR).

A-6400-245 (05/87)

9 3 1 2 7 6 2 2 0 5 3

A Item No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	Chemical Components	H Weight %	I Physical Properties	J Hazards	I Waste Status	L Container Status
2300	1	2 l	Glass	2 kg	Di Butyl Tetra Ethylene Glycol	unknown age	100	liquid	E	O	F
2301	1	1 l	glass	1 kg	2-Methoxy Ethyl Ether	unknown age	100	liquid	E	O	F
2302	1	1 pt	glass	.5 kg	n-propyl Ether	unknown age	100	liquid	E	O	F
2303	1	50gm	glass	50 gm	1,3,5 Tri Nitro Benzene	unknown age	100	Solid	E	O	F
2304	1	1 pt	glass	.5 kg	1,4 Diethoxy Butane	unknown age	100	liquid	E	O	F
2305	1	100 gm	glass	100g	2-Ethoxy Butanone	Unknown age	100	Solid	E	O	F
2306	1	25 gm	glass	25 gm	Di Methoxy Propane	unknown age	100	Solid	E	O	F
2307	1	25 gm	glass	25 gm	Di ethylene Glycol	Unknown age	100	Solid	E	O	F
2308	1	25 gm	glass	25 gm	Di-tert-butyl-Ether	Unknown age	100	Solid	E	O	F
2309	1	.1 kg	glass	100 gm	2,4,6 Trinitro-m-Toluene	Unknown age	100	Solid	E	O	F

9 3 1 2 7 2 2 0 5 4

PNL - 25 - 210

Complete u. .d parts and forward to:
Hazardous Waste Unit
2750E/A113/200E
Westinghouse

CHEMICAL WASTE D..POSAL REQUEST

Generator Logbook No. 89-032

Manifest No.

Disposal Analysis Distribution*
1. Generator 4. _____
2. H.W.U. 5. _____
3. _____ 6. _____
*May be used by generator as needed.

Requested By	Telephone No.	Address	Company
Glenn Thornton	6-7688	P7-68	PNL

Signature/Date: Glenn Thornton 3/24/89

Accumulation Date: 3/24/89

WASTE DESCRIPTION (For additional items, continue on the back of this form)

A Item No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Waste Status	L Container Status
Example 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% In Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH <2 Flash point >200 °F	C	O	F
Example 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
Example 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0' <1 ppm	Liquid, pH = 8.2 Flash Point >200 °F	None	U	MT
2340	1	100g	Glass	25g	HEXANITRODIPHENYL-Amine	SAME	100	Solid	E	O	PF
2341	1	.5 k	Glass	450g	Ammonium Perchlorate	SAME	100	Solid	E	O	F
2342	1	100g	Glass	100g	Benzoyl Peroxide	SAME	100	Solid	E	O	F
2075	3	500g	Glass	1.5 K	Hydrazine Hydrate	SAME	100	Liquid	E	O	PF
2076	1	1 gal	Glass	0.5 K	Hydrazine Hydrate	Same	100	Liquid	E	O	PF

INSTRUCTIONS

Accumulation Date – List the accumulation date of the oldest waste

Column A – Item Number – Item number for each unique waste.

Column B – Number of Containers – Number of containers of a unique waste to be disposed

Column C – Container Size – Size of containers specified in Column B. If multiple container sizes, specify number and size of each

Column D – Container Description – Specify container's DOT specification If non-DOT container or unknown, specify type, e g steel drum

Column E – Total Waste Quantity – Total waste quantity (in kilograms only) of each unique waste to be disposed

Column F – Waste Description – Specify trade name or general description of each unique waste If waste material is a paint, specify color for evaluation of pigments.

Column G – Chemical Components – List all organic and inorganic components of the unique waste using specific chemical names Attach Material Safety Data Sheets, analytical data, or other documents to adequately describe the composition of the waste

Column H – Weight (%) – For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.

Column I – Physical Properties – Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.

Column J – Hazards – Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).

Column K – Waste Status – Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).

Column L – Container Status – Indicate whether container is: Full (F), Partially Full (PF), Empty (<¼ in. in 55 Gal Drums) (MT), Triple Rinsed (TR).

A-6400-245 (05/87)

9 3 1 2 7 6 2 2 0 5 5

A Item No	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Physical Status	L Container Status
2559	1	1 gal	Glass	4 kg	Tetrahydrofuran	Tetrahydrofuran	100	liquid	E	O	F

A-6400-24 87)

Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support Unit 13841-89-012
Phone: 3-3516 2750E/A119/200E R1-51
Date: March 6, 1989
Subject: GENERATOR LOGBOOK NUMBER 87-257, SITE HAZARDOUS WASTE ENGINEERING SUPPORT UNIT LOGBOOK NUMBER WHC-25-134

To: M. E. Burnside L6-40

cc: M. R. Romsos R2-82 dlh
RLG: File/LB

The following item is to be detonated on site:

Container	Total wt	Chemical	Waste Codes
1 ea, 5 gal, DM	0.5 K	Sodium potassium alloy	D001, D003

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
R. L. Granberg
Technician

cmc

9312220056

9 3 1 2 7 6 2 2 0 5 7

omplete unsha ts and forward to:
Hazardo. aste Unit
R1-51
Westinghouse

CHEMICAL WASTE . OSAL REQUEST

Manifest No.

Generator Logbook No. 87-257

Disposal Analysis Distribution*
1. Generator 4. ____
2. H.W.U. 5. ____
3. ____ 6. ____
*May be used by generator as needed.

equested By	Telephone No.	MSIN	Company
M.E. BURNSIDE	6-0426	L6-40	WHC

ignature/Date	Accumulation Date	Generating Facility
ME Burnside 3-1-89		3718F

WASTE DESCRIPTION (For additional items, continue on the back of this form)

tem No.	B No. of Containers	C Container Size	D Container Description	E Total Waste Quantity (kg)	F Waste Description	G Chemical Components	H Weight %	I Physical Properties	J Hazards	K Waste Status	L Container Status
xample 1	1	55 gal	DOT 17E	205	TURCO Decon 4512A Solution, 10% In Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH<2 Flash point >200 °F	C	O	F
xample 2	1	5 gal	DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S	PF
xample 3	23	55 gal	Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 <1 ppm	Liquid, pH = 8.2 Flash Point >200 °F	None	U	MT
1	1	5 gal	steel Drum	.5	Potassium + Sodium Alloy (NAK)	NAK and possibly oil		Liquid	T, R,	O	PF
					May present Explosive hazard (in storage for 2 yrs)						

NSTRUCTIONS

Accumulation Date – List the accumulation date of the oldest waste

Column A – Item Number – Item number for each unique waste.

Column B – Number of Containers – Number of containers of a unique waste to be disposed

Column C – Container Size – Size of containers specified in Column B. If multiple container sizes, specify number and size of each.

Column D – Container Description – Specify container's DOT specification. If non-DOT container or unknown, specify type, e.g. steel drum.

Column E – Total Waste Quantity – Total waste quantity (in kilograms only) of each unique waste to be disposed

Column F – Waste Description – Specify trade name or general description of each unique waste. If waste material is a paint, specify color for evaluation of pigments.

Column G – Chemical Components – List all organic and inorganic components of the unique waste using specific chemical names. Attach Material Safety Data Sheets, analytical data er documents to adequately describe the composition of the waste.

Column H – Weight (%) – For each waste component indicate percent or range of percents in which the component is present in the waste. Trace amounts of pesticides, herbicides, heavy metals and PCB's should be specified. Components must add up to 100% including water, earth, or other components. If a unit other than percent is used, indicate the unit. When possible, provide test results or other documentation to verify percentages.

Column I – Physical Properties – Indicate whether Solid (S), Liquid (L), or Gas (G) or any combination of these phases, also indicate pH and flash point.

Column J – Hazards – Indicate whether waste is Corrosive (C), Ignitable (I), Reactive (R), Toxic (T), Explosive (E), Persistent (P), EP Toxic (EP) or Carcinogenic (X).

Column K – Waste Status – Indicate whether waste is: Reacted (Rx), Treated (T), New (N), Used (U), Old (or expired) (O), Spill Material (S).

Column L – Container Status – Indicate whether container is: Full (F), Partially Full (PF), Emptv (<½ in. in 55 Gal Drums) (MT), Triple Rinsed (TR).

ENCLOSURE II

CHEMICALS TO BE DETONATED

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
1,4 - DIOXANE (PNL-25-209)	11	5.45 Kg	1-pt	PF	332
p-Dioxane (PNL-25-209)	1	1.0 Kg	1/2-gal	PF	332
Tetrahydrofuran (PNL-25-209)	1	3.8 Kg	1-gal	F	332
Nitrocellulose/ Isopropyl Alcohol (PNL-25-209)	2	2.0 Kg	1-pt	F	332
n-Butyl Ether (PNL-25-209)	1	5.0 Kg	1-qt	F	332
Dibutyl Tetra Ethylene Glycol (PNL-25-209)	1	2.0 Kg	2-liter	F	332
2-Methoxyethylether (PNL-25-209)	1	1.0 Kg	1-liter	F	332
n-Propylether (PNL-25-209)	1	0.5 Kg	1-pt	F	332
1,3,5-Trinitro Benzene (PNL-25-209)	1	0.05 Kg	50-g	F	332
1,4-Diethoxybutane (PNL-25-209)	1	0.5 Kg	1-pt	F	332
2-Ethoxybytanone (PNL-25-209)	1	0.1 Kg	100-g	F	332
Dimethoxypropane (PNL-25-209)	1	0.025 Kg	25-g	F	332

Note: F = full, PF = partially full

9 3 1 2 7 0 2 2 0 5 8

CHEMICALS TO BE DETOANTED (Continued)

CHEMICAL NAME	QUANTITY	TOTAL AMOUNT	CONTAINER	STATUS	LOCATION
~~Diethyleneglycol (PNL-25-209)~~	~~1~~	~~0.025 Kg~~	~~25-g~~	~~F~~	~~332~~
	Same only list once! JWO 4-28-89				
Di-tert-butyl-ether (PNL-25-209)	1	0.025 Kg	25-g	F	332
2,4,6-Trinitro-m-toluene (PNL-25-209)	1	0.1 Kg	100-g	F	332
Hexanitrodiphenyl-amine (PNL-25-210)	1	0.025 Kg	100-g	PF	332
Ammonium Perchlorate (PNL-25-210)	1	0.45 Kg	500-g	F	332
Benzoyl Peroxide (PNL-25-210)	1	0.1 Kg	100-g	F	332
Hydrazine Hydrate (PNL-25-210)	3	1.5 Kg	500-g	PF	332
Hydrazine Hydrate (PNL-25-210)	1	0.5 Kg	1-gal	PF	332
Tetrahydrofuran (PNL-25-210)	1	4.0 Kg	1-gal	F	332
Sodium-Potassium Alloy (NaK) (WHC-25-134)	1	0.5 Kg	5-gal	PF	3718F
Picryl Chloride	1	0.06 Kg	4-oz	PF	332 JWO 1-25-89

Note: F = full, PF = partially full

Westinghouse Hanford Company

Internal Memo

From: Site Hazardous Waste Engineering Support 13841-89-022
Phone: 3-3516 2750E/A119/200E/R1-51
Date: April 19, 1989
Subject: GENERATOR LOG #89-028, SHWES LOG #PNL-25-209

To: G. T. Thornton P7-68

cc: J. W. Olson R2-82
M. R. Romsos R2-82
D. W. Wilson R1-51
RLG File/LB

The following items are to be detonated on site:

Item #	Containers	Total Wt.	Chemical	Waste Codes
2295	11 ea, 1-pt glass	5.0 K	1,4-dioxane	WT01, WC01, D001, D003
2296	1 ea, 1-gal glass	1 K	p-dioxane	WT01, WC01 D001, D003
2298	1 ea, 1-gal glass	3.8 K	tetrahydrofuran	U213, WT02 D001
2297	2 ea, 1-pt metal	2 K	nitrocellulose in isopropyl alcohol	D001, D003
2299	1 ea, 1-qt glass	.5 K	n-butyl ether	WT02, D001 D003
2301	1 ea, 1-l glass	1 K	2-methoxy ethyl ether	D003
2302	1 ea, 1-pt glass	.5 K	n-propyl ether	D001, D003
2303	1 ea, 50-gm glass	.05 K	1,3,5-trinitro-benzene	D003
2309	1 ea, .1-K glass	.1 K	2,4,6-trinitro-m-toluene	WT02, D001 D003
3691	1 ea, 4-oz glass	.06 K	picryl chloride	WP01, D003
2300	1 ea, 2-l glass	2 K	dibutyl tetra-ethylene glycol	N/A
2304	1-ea, 1-pt glass	.5 K	diethoxybutane	N/A

Item #	Containers	Total Wt.	Chemical	Waste Codes
2305	1 ea, 1-K glass	.1 K	2-ethoxybutanone	N/A
2306	1 ea, .025-K glass	.025 K	dimethoxypropane	N/A
2308	1 ea, .025-K glass	.025 K	ditertbutylether	N/A

Contact M. R. Romsos on 373-4032 for any further instructions.

Items #2307 and #3692 are being deleted from the Chemical Waste Disposal Request because the reference material lists no acute hazards.

If you have any questions or concerns, please contact me on 373-3516.

R.L. Granberg

R. L. Granberg, Technician
Site Hazardous Waste
Engineering Support

rjh

Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support 13841-89-018
Phone: 3-3516 2750E/A119/200E/R1-51
Date: April 4, 1989
Subject: GENERATOR LOG #89-032, SHWES LOG #PNL-25-210

To: G. T. Thornton P7-68

cc: M. R. Romsos R2-82
D. W. Wilson R1-51
RLG File/LB

The following items are to be detonated onsite:

Item #	Containers	Total Wt.	Chemical	Waste Codes
2340	1-ea 100 g glass	.025 K	hexadinitrophenylamine	D003
2341	1-ea .5 K glass	.45 K	ammonium perchlorate	D003
2342	1-ea 100 g glass	.1 K	benzoyl peroxide	D003
2359	1-ea 1 gal glass	4.0 K	tetrahydrofuran	U213 WT02 D001 D003

Contact M. R. Romsos on 373-4032 for further instructions.

Items #2075 and 2076 will be put on a chemical waste disposal analysis as this unit believes these should be shipped offsite for disposal.

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
R. L. Granberg
Technician

rjh

Westinghouse
Hanford Company

Internal
Memo

From: Site Hazardous Waste Engineering Support Unit 13841-89-012
Phone: 3-3516 2750E/A119/200E R1-51
Date: March 6, 1989
Subject: GENERATOR LOGBOOK NUMBER 87-257, SITE HAZARDOUS WASTE ENGINEERING SUPPORT UNIT LOGBOOK NUMBER WHC-25-134

To: M. E. Burnside L6-40

cc: M. R. Romsos R2-82
RLG: File/LB

The following item is to be detonated on site:

Container	Total wt	Chemical	Waste Codes
1 ea, 5 gal, DM	0.5 K	Sodium potassium alloy	D001, D003

If you have any questions or concerns on the subject, please contact me on 373-3516.

R. L. Granberg
R. L. Granberg
Technician

cmc

Form Approved OMB No. 2050-0039 Expires 9-30-88

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST
(Continuation Sheet)

21. Generator's US EPA ID No.: WA 7890008967

Manifest Document No.: (PNL)25209(D)

22. Page: 2 of 5

Information in the shaded areas is not required by Federal law.

1. Generator's Name
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352
PHONE (509) 373-4032 OR (509) 375-5491, att: MR ROMSOS

L. State Manifest Document Number

M. State Generator's ID

24. Transporter ___ Company Name

25. US EPA ID Number

N. State Transporter's ID

O. Transporter's Phone

26. Transporter ___ Company Name

27. US EPA ID Number

P. State Transporter's ID

Q. Transporter's Phone

	28. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	HM	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.	WASTE FLAMMABLE LIQUID, N.O.S. UN1993	X	1	CF	.21	K	WT02,D001,D003 WP01
b.							
c.							
d.							
e.							
g.							
h.							
i.							

GENERATOR

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

TRANSP

33. Transporter ___ Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

34. Transporter Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

35. Discrepancy Indication Space

9 3 1 2 7 2 2 0 6 4

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved OMB No. 2050-0039. Expires 9-30-91.

Form Approved OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: WA 7890008967

Manifest Document No.: (WHC)25134(D)

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

Generator's Name and Mailing Address
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352

4. Generator's Phone (509) 373-4032(w)/375-5491(h) att: MR ROMSOS

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: RICHLAND POLICE/DOE-RL

6. US EPA ID Number: WA7890008967

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name: NONE

8. US EPA ID Number: N/A

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2401 STEVENS DR., RICHLAND, WA 99352
CHEMICAL DETONATION PIT

10. US EPA ID Number: WA7890008967

G. State Facility's ID

H. Facility's Phone

GENERATOR

	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	Waste Sodium potassium alloy, solid Flammable solid, UN1422, "Dangerous when wet" (D003)	RQ	1	DM	.5	K	D001,D003
b.							
c.							
d.							

Additional Descriptions for Materials Listed Above
- o Additional information and public reporting burden on accompanying paperwork.
- o All materials on this manifest are suspected of being shock sensitive and will be disposed of by detonation.

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

RETURN TO GENERATOR IF NOT DELIVERED

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: ME BURNSIDE | Signature: M.E. Burnside | Month 4 Day 26 Year 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: RICHLAND POLICE BOMB SQUAD | Signature: | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: NONE | Signature: NA | Month Day Year

FAC

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

Style F15REV-6 Labelmaster, Div. of American Labelmark Co. (312) 879-0800

EPA Form 8700-22 (Rev. 9/86) Previous editions are obsolete.

EPA Form 8700-22 (Rev 9/88) Previous editions are obsolete.

9 3 1 2 7 6 2 2 0 6 5

CHEMICAL WASTE DISPOSAL ANALYSIS NO. WHC-25-282

ISSUE DATE JUN 0 5 1989

WASTE GENERATOR

Name D. J. Alexander

Address R3-54

Organization Westinghouse Hanford Company

Telephone 373-2627

Generator Logbook No. N/A

Accumulation Date April 24, 1989

Waste Shipment Deadline Date July 21, 1989

SITE HAZARDOUS WASTE ENGINEERING SUPPORT
2750E/A113/200 East (MSIN R1-51)

Disposal Analysis by G. A. Hackett 6-01-89 Telephone 373-4809
G. A. Hackett

Approval(s) Site Hazardous Waste Engineering Support Representative

D. W. Wilson, Manager 6/5/89

INSPECTION: Inspection Representative G. O. Boness 376-7627

TRANSPORTATION: SEE APPLICABLE FACILITY FOR TRANSPORTATION REPRESENTATIVE.

WASTE STORAGE/DISPOSAL DESTINATION(S) [Check applicable facility(s)]

XX	616 Nonradioactive Dangerous Waste Storage Facility/616 Building/600 Area	Transportation Representative	P. L. Hemsworth 373-1881
___	212-P PCB Storage Facility 212-P Building/200 North Area Facility Representative S. M. Baker 373-3806	Transportation Representative	R. G. Dean 376-1420
___	Central Landfill Nonregulated Drum Storage Area/600 Area	Transportation Representative	R. G. Dean 376-1420
XX	Central Landfill Trash Trench/600 Area		
XX	Shock Sensitive/Reactive/Explosive Waste Disposal	Representative	M. R. Romsos 373-4032
___	Other:		

PICK UP ON MONDAYS & TUESDAYS ONLY - SCHEDULE APPROXIMATELY 1 WEEK IN ADVANCE.

Attachments

S. M. Baker (PCB Facility only)
G. O. Boness
J. E. Chulos (616 Facility only)
P. L. Hemsworth (616 Facility only)
D. E. Phelps (Central Landfill only)
M. R. Romsos
SHWES File

9 3 1 2 7 2 2 0 6 6

DISPOSAL ANALYSIS NO. WHC-25-282

EXPLOSIVE WASTE

The following waste is determined to be explosive, and must be disposed of by contacting Mike Romsos on 3-4032.

#22	Sodium Azide	1	100-g glass jar (unopened)	.1 K

9 3 1 2 7 5 2 2 0 3 5 7

DON'T SAY IT --- *Write It!*

DATE June 19, 1989

TO M. R. Romsos

FROM G. A. Hackett
373-4809

cc: SHWES File

SUBJECT: Chemical Waste Disposal Request No. WHC-25-282

Following is the information you requested on Sodium Azide:

Proper Shipping Name: Waste Sodium Azide (Land Ban: P105)
Hazard Class: Poison B
I.D NO.: UN1687
Waste No's: P105, D003, WT02 (EHW)
Label: Poison

+ "TO MAKE LIFE LAST, PUT SAFETY FIRST" +

9 3 1 2 7 2 2 0 5 8

MIKE - Please Add 2 containers to item 2295 from disposal request 89-028 (PNL-NUMBER). These are 2 more 1 pt bottles of 1,4 Dioxane of unknown age. This would bring the total for item 2295 to 11, 1 pt. bottles of 1,4 - Dioxane for the next detonation.

3/29

Thanks

Glenn Thornton

JWD
4-11-89

Weight per bottle? 0.475 kg ea
Total = 4.5 + 2(.475) = 5.45 kg

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved OMB No. 2050-0039. Expires 9-30-91.

Form Approved OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WA 7890008967

Manifest Document No. (PNL)25209(D)

2. Page 1 of 2

Information in the shaded areas is not required by Federal law.

Generator's Name and Mailing Address
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2401 STEVENS DR., R2-82, RICHLAND, WA 99352

4. Generator's Phone (509) 373-4032(w)/375-5491(h) att: MR ROMSOS

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: RICHLAND POLICE/DOE-RL

6. US EPA ID Number: WA7890008967

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name: NONE

8. US EPA ID Number: N/A

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2401 STEVENS DR., RICHLAND, WA 99352
CHEMICAL DETONATION PIT

10. US EPA ID Number: WA7890008967

G. State Facility's ID

H. Facility's Phone

GENERATOR

	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	WASTE FLAMMABLE LIQUID N.O.S. UN1993 (nitrocellulose)(D003)	RQ	1	CF	4.075	K	D001,D003
b.	WASTE DIOXANE FLAMMABLE LIQUID, UN1165	RQ	2	CF	6	K	WT01,WC01, D001,D003
c.	WASTE FLAMMABLE LIQUID, N.O.S. UN1993 (D003)	RQ	1	CF	4.85	K	WT02,D001, D003
d.	WASTE TETRAHYDROFURAN FLAMMABLE LIQUID, UN2056	X	2	CF	7.8	K	U213,WT02, D001

Additional Descriptions for Materials Listed Above
o Additional information and public reporting burden on accompanying paperwork.
o All materials on this manifest are suspected of being shock sensitive and will be disposed of by detonation.

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

RETURN TO GENERATOR IF NOT DELIVERED

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: GT THORNTON | Signature: Glenn Thornton | Month 4 Day 26 Year 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: RICHLAND POLICE BOMB SQUAD | Signature: | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: NONE | Signature: NA | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: | Signature: | Month Day Year

Style F15REV-6 Labelmaster, Div. of American Labelmark Co. (312) 878-0900 EPA Form 8700-22 (Rev 9/86) Previous editions are obsolete.

EPA Form 8700-22 (Rev 9/88) Previous editions are obsolete.

3 1 1 2 7 2 2 0 7 0

TSD FACILITY UNMANIFESTED DANGEROUS WASTE REPORT

Mail Original To:

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
H.W. Section R/6 M/S PV-11
Olympia, WA 98504-8711

FORM 6

DATE RECEIVED BY WCCE

DEPARTMENT USE ONLY

I. RECEIVING FACILITY INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 6 7 Facility Name: U.S. Department of Energy

Facility Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

Facility Contact Person: M. R. Romsos Phone Number: (509) 373-4032

II. GENERATOR INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 7 6 Generator Name: U.S. Department of Energy

Generator Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

III. TRANSPORTER INFORMATION

EPA/State I.D. #: N/A Transporter Name: Richland Police Department

Transporter Address (incl. City, State, Zip): 505 Swift Blvd., Richland, WA 99352

Driver's Name: J. L. Devin Driver's License No.: DELVIDL4425N State: WA

Vehicle License No: D29755 D33522 State: ICC or Other License Numbers: N/A

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility: 4/26/89

B. Identification of Waste(s)

LINE NUMBER	1 Physical State S=solid L=liquid G=sludge	2 Chemical Nature O=Organic I=Inorganic	3 Description of Waste	4 Handling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 WEIGHT CODE
1.			(See Attached)				
2.							
3.			T18 = Detonation				

V. COMMENTS

Due to their age and method of storage, the chemicals described on this report were determined (through process knowledge), to be reactive and potentially shock sensitive. For safety reasons, the chemicals were transported in a trailer mounted bomb containment vessel to a Department of Energy-Richland Operations site permitted for this activity. The transportation vehicle was operated by the Richland Police Bomb Squad. Vehicle traffic during the transfer was controlled by site security personnel (transfer was performed during a low traffic time period). Ambulance and Fire Department Units were present during the operations. The bomb squad detonated the suspect chemicals using high explosives. The chemicals were not from an off-site generator.

VI. CERTIFICATION

Certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

MR Romsos — PRINT OR TYPE NAME

SIGNATURE

9/21/89 — DATE SIGNED

ECL 984

ATTACHMENT 1

RECEIVING FACILITY INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 6 7 Facility Name: U.S. Department of Energy

Facility Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

Facility Contact Person: M R Romsos Phone Number: (509) 373-4032

GENERATOR INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 6 7 Generator Name: U.S. Department of Energy

Generator Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility: 4/26/89

B. Identification of Waste(s)

LINE NUMBER	1 Physical State S=Solid L=Liquid G=Sludge	2 Chemical Nature O=Organic I=Inorganic	3 Description of Waste	4 Handling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 Weight Unit
1.	S	O	Nitrocellulose (In iso-propyl alcohol)	S01	D001 T18 D003	2.0	K
	L	O	Dibutyl Tetra Ethylene Glycol	S01 T18	D003	2.0	K
3.	L	O	2-Methoxyethylether	S01 T18	D003	1.0	K
4.	S	O	1,3,5-Trinitro Benzene	S01 T18	D003	0.05	K
5.	L	O	1,4-Diethoxybutane	S01 T18	D003	0.5	K
6.	L	O	2-Ethoxybutanone	S01 T18	D003	0.1	K
7.	L	O	Dimethoxypropane	S01 T18	D003	0.025	K
8.	L	O	Di-tert-butyl ether	S01 T18	D003	0.025	K
9.	S	O	Hexanitrodiphenylamine	S01 T18	D003	0.025	K
10.	S	I	Ammonium Perchlorate	S01 T18	D003	0.45	K
11.	S	O	Benzoyl Peroxide	S01 T18	D003	0.1	K
	L	O	n-Propylether	S01 T18	D001 D003	0.5	K

9 3 1 2 7 2 2 0 7 2

ATTACHMENT 1

(con't)

RECEIVING FACILITY INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 6 7 Facility Name: U.S. Department of Energy

Facility Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

Facility Contact Person: M.R. Romsos Phone Number: (509) 373-4032

GENERATOR INFORMATION

EPA/State I.D. #: W A 7 8 9 0 0 0 8 9 6 7 Generator Name: U.S. Department of Energy

Generator Address (incl. City, State, Zip): 2401 Stevens Drive, Richland, WA 99352

IV. WASTE INFORMATION

A. Date This Waste Shipment Received By Your Facility: 4/26/89

B. Identification of Waste(s)

Line Number	1 Physical State S=solid L=liquid G=sludge	2 Chemical Nature O=Organic I=Inorganic	3 Description of Waste	4 Handling Method Code	5 Dangerous Waste Number	6 Amount of Waste	7 Weight Code
13.	L	I	Hydrazine Monohydrate	S01 T18	D001 D003	2.0	K
14.	S	I	Sodium Potassium Alloy	S01 T18	D001 D003	0.5	K
15.	S	O	Picryl Chloride	S01 T18	D001 D003	0.06	K
16.	S	O	2,4,6-Trinitro-m-toluene	S01 T18	WT02 D001 D003	0.1	K
17.	L	O	n-Butyl Ether	S01 T18	WT02 D001 D003	0.5	K
18.	L	O	Tetrahydrofuran	S01 T18	U213 D001	7.8	K
19.	L	O	1,4-Dioxane	S01 T18	WT01 D001 D003	6.45	K

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Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WA7890008967 Manifest Document No. 004712

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
DEPARTMENT OF ENERGY, RICHLAND OPERATIONS
P.O. BOX 550, 2355 STEVENS DR., R2-82, RICHLAND, WA 99352

4. Generator's Phone (509) 376-7688(w) att: GT THORNTON

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name
RICHLAND POLICE BOMB SQUAD

6. US EPA ID Number N/A

C. State Transporter's ID

D. Transporter's Phone (509) 943-9161

7. Transporter 2 Company Name
NONE

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
HANFORD PATROL ACADEMY
DEMOLITION SITE

10. US EPA ID Number WA7890008967

G. State Facility's ID

H. Facility's Phone (509) 373-4032

	11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a.	Waste High Explosive Explosive A (1,3,5-Trinitrobenzene)	X	1	CF	.05	K	D003, U234 WT02
b.	Waste Lithium Aluminum Hydride, Ethereal Flammable Liquid, UN1411	X	1	CF	1.0	K	D001, D003 WT02
c.							
d.							

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
T18 (detonation)

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Glenn Thornton
Signature: Glenn Thornton for USDOE/PNL
Month Day Year: 06 06 90

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: NA
Signature:
Month Day Year:

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: NA
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: MR Romsos
Signature:
Month Day Year: 06 06 90

GENERATOR — TRANSPORTER — FACILITY

Style F15REV-6 LABELMASTER, Div. of AMERICAN LABELMARK CO., CHICAGO, IL 60646

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

ORIGINAL-RETURN TO GENERATOR

9312722074

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00472

CHEMICAL WASTE DISPOSAL REQUEST

Qualified Generator	MSIN	Telephone No.	Company	Manifest No.
Glenn Thornton	P7-68	376-7688	PNL	

Signature/Date	Accumulation Date	Generator Log Number	Generating Facility
Glenn Thornton 4/17/90	4/12/90		325/305-B

WASTE DESCRIPTION

A Item No.	B Number of Containers	C Container Description	D Kg Waste	E Waste Description	F Chemical Components	G Weight %	H Physical Properties	I Hazards	J Status / K
Example 1	1	55 gal DOT 17E	205	TURCO Decon 4512A Solution, 10% in Water	TURCO 4512A MSDS Attached Water	10.0 90.0	Liquid, pH <2 Flash point >200 °F	C	O / F
Example 2	1	5 gal DOT 37M	34	Waste from Hg Cleanup	Mercury Rags Soil	1.3 4.0 94.7	Solid	EP	S / PF
Example 3	23	55 gal Steel Drum	0	Empty Conoco 32 Oil Drums - Contained Used Oil	Oil-MSDS Attached PCB - Lab Data Attached	100.0 <1 ppm	Liquid, pH = 8.2 Flash Point >200 °F	None	U / MT
1	1	Glass Bottle (1 l)	1 kg	Lithium Aluminum Hydride Ethyl Ether	Lithium Aluminum Hydride Ethyl Ether	3 % 97 %	Liquid Flammable potentially Explosive solids (peroxides?) formed	F, E	O / F
2	1	Glass Bottle (4 oz)	0.05	Trinitrobenzene	Trinitrobenzene	100%	Solid Explosive	E	O / PF

A - Item number
B - How many containers
C - Size, Type, DOT Spec
D - Kilograms of Waste
E - Trade name or description
F - List everything! Attach MSDS, lab analysis, etc.

G - Weight must total 100%
H - Physical properties: pH, Flashpoint, (G)as, (L)iquid, (S)olid
I - (C)orrosive, (I)gnitable, (T)oxic, (E)xplosive, (P)ersistant, Carcinogen (X)

J - Waste status: (S)pill, (U)sed, (O)ld, (R)eacted
K - Container status: (F)ull, Partfull (PF), Empty (MT), Triple rinsed (TR)
See WHC-CM-5-16 for detailed instructions.

Complete and submit to:

SITE HAZARDOUS WASTE ENGINEERING SUPPORT
R1-51/WHC
Westinghouse

Continued on reverse

A-6400-245 (08/89)

Hazardous Waste Disposal Analysis Record (HWDAR)

Please disregard previous letter issued on September 25, 1991

ISSUE DATE OCT 0 8 1991

DISPOSAL ANALYSIS No. 10948 Gen. Log No. T-91-015

GENERATOR R. W. Szelmeczka MSIN T3-28 PHONE 3-4329 COMPANY WHC

ACCUMULATION DATE 8/28/91 SHIPPING DEADLINE DATE 11/25/91

Analysis: Mandrake F. Pascual Mandrake F. Pascual Phone 376-4839

Review: Approval: Debi Turman for MPA

****

GENERAL INSTRUCTIONS

Package, Label, and Mark according to the Shipping Summary Table (attached).

All shipping containers must be in good condition and tightly closed.

Container gross weight should be 450 pounds or less whenever possible.

Complete a Uniform Hazardous Waste Manifest for shipments of regulated waste.

All regulated waste must be inspected by Transportation Logistics (376-7627)

Obtain radiological release or exemption within 24 hours before transport.

Arrange for transport at least one week ahead of time.

SEE WHC-CM-5-16 AND WHC-CM-2-14 FOR DETAILS OF PACKAGING AND SHIPPING

****

Waste Destination	Transportation Rep.	Phone Number
X 616 Nonradioactive Waste Storage	R. Pedraza	373-1881
___212-P PCB Storage 200 North	P. C. Hendrix	376-0971
___Non-regulated Drum Storage	P. C. Hendrix	376-0971
X Central Landfill Trash Trench	P. C. Hendrix	376-0971
X Other: Item #32	M. R. Romsos	376-4900

****

cc: Solid Waste Engineering Analysis, others as needed:

M. A. Sams	G2-03	D. L. Barron	S2-62
J. W. Pratt	T4-01	M. R. Romsos	N3-11
R. Pedraza	T3-21	Central Landfill operator	G4-07

9 3 1 2 7 2 2 0 7 6

MANIFEST NO: 10948
ITEM NUMBER: 42
SHIPPING NAME: Non-RCRA waste, liquid (continued)
WASTE CONTENT: Dow Corning (R) DB-110A Anti Foam Emulsion; 95% polyethylene glycol, 10% silicon fluid
QUANTITY: (1) glass bottle weighing 0.5 Kg
WASTE NUMBERS: WT02, (DW)

ITEM NUMBER: 52
WASTE CONTENT: 100% sodium iodide
QUANTITY: (10) glass & plastic containers weighing 1.5 Kg
WASTE NUMBERS: WT02, (DW)

ITEM NUMBER: 45 & 46 SHIPPING NAME: Waste Sodium dichromate
WASTE CONTENT: 100% sodium dichromate. (Land Ban: D007)
HAZARD CLASS: ORM-A
DOT ID NO: NA1479
DOT LABEL: Hazardous waste
PACKAGING: Per 49 CFR 173.505
QUANTITY: (1) glass bottle & (1) plastic bottle weighing a total of 0.9 Kg
WASTE NUMBERS: D007, D002, WC01, WT02, (EHW)
SHIP TO: 616 building CELL: 0

ITEM NUMBER: 49 SHIPPING NAME: Hazardous waste, solid, N.O.S.
WASTE CONTENT: 99% barium carbonate. (Land Ban: D005)
HAZARD CLASS: ORM-E
DOT ID NO: NA9189 (barium carbonate)
DOT LABEL: Hazardous waste
PACKAGING: Per 49 CFR 173.1300
QUANTITY: (1) glass bottle weighing 0.1 Kg
WASTE NUMBERS: D005, WT02, (EHW)
SHIP TO: 616 building CELL: Any, except 0

ITEM NUMBER: 32 (Hydroxylamine hydrochloride,crystal)

* This material can react violently with shock, friction, or heat according to the Material Safety Data Sheet.

* Please contact Mike R. Romsos at 376-4900 for disposal of this waste.

The following waste is not regulated according to WAC 173-303 and 40 CFR 261.

Item no. 7: (1) steel can weighing 0.5 Kg that contains 100% aluminum hydroxide.

Item no. 8: (4) poly bottles weighing 0.25 Kg that contains DOW Corning Polystyrene Latex UPSL.

Item no. 17: (1) plastic bottle weighing 0.5 Kg that contains 100% ferric oxide.

Item no. 18: (1) plastic bottle weighing 0.5 Kg that contains 98-100% calcium chloride, dihydrate.

9 3 1 2 7 6 2 2 0 7 7

APPENDIX 5A

GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

9 3 1 2 7 2 2 0 7 8

APPENDIX 5A

CONTENTS

5A.0 GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES . . . . . APP 5A-1

5A.1 EXISTING GROUNDWATER WELLS . . . . . APP 5A-1

5A.2 GROUNDWATER DATA . . . . . APP 5A-1

5A.3 GEOLOGIC CHARACTERISTICS . . . . . APP 5A-2

5A.4 GEOHYDROLOGIC CHARACTERISTICS . . . . . APP 5A-4

5A.5 POTENTIAL MIGRATION . . . . . APP 5A-5

5A.6 SUMMARY . . . . . APP 5A-6

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5A-2. Well Summary for 6-531-1 and 6-531-1P . . . . . APP 5A-F2
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5A-5. Water Quality Data . . . . . APP 5A-F5
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5A-7. 100-Year Flood Event. . . . . APP 5A-F7

5A.0 GROUNDWATER DATA FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

Two groundwater wells are located in the general vicinity of the HPADS; one of these wells consists of two completions at a single location (Figure 5A-1). These wells currently are being used by the Hanford Sitewide environmental surveillance program, which is conducted by Pacific Northwest Laboratory under DOE Order 5400.1. The wells were constructed before RCRA well standards. The well construction characteristics are shown in Figures 5A-2 and 5A-3. The well descriptions are from the original driller's logs; no geologist logs are available.

5A.1 EXISTING GROUNDWATER WELLS

Well 699-S31-1 is located approximately 1 mile (1.6 kilometer) south of the HPADS. The well is roughly up- (groundwater flow) gradient and is completed to monitor the uppermost confined aquifer. The well was drilled in 1951 to a total depth of 228 feet (69.5 meters) where it bottomed in basalt. The well is perforated between 93 and 103 feet (28.3 and 31.4 meters). While drilling, groundwater from several hydrologic units were apparently encountered. A second, 4-inch (10.2-centimeter) casing was installed inside the larger casing, and a cement seal placed between 142 and 177 feet (43.3 and 53.9 meters), in an attempt to isolate groundwater from different strata. The unperforated 4-inch (10.2-centimeter) casing is probably the well labeled 699-S31-1P. The well appears to monitor confined conditions near the base of the Ringold Formation, or possibly a flow top in the uppermost basalt strata.

Well 699-S28-E0 (E "zero") is located approximately 0.75 mile (1.2 kilometer) east of the HPADS. The well is downgradient and is completed in the unconfined aquifer, with perforations between 90 and 180 feet (27.4 and 54.9 meters). The well was drilled in 1981 as a 'sanitary water well', and bottomed in basalt at 236 feet (71.9 meters). A bentonite surface seal was installed.

In the following sections, the 699- prefix is omitted from the well numbers for brevity.

5A.2 GROUNDWATER DATA

Groundwater quality data and hydraulic head data described in the following paragraphs for the two well locations are taken from the operating contractor's Geosciences Group Paradox* database. This database in an outgrowth of the former Hanford Groundwater Data Base, and fills an interim need for a groundwater data management system while the Hanford Environmental Information System (HEIS) is being developed. The data presented should be used for informational purposes only.

---

*Paradox is a software product by Borland International.

Hydrographs for S31-1 and S31-1P are shown in Figure 5A-4. The change in trends that occur in the late 1970's might be related to the removal of piezometers, as indicated on a subsequent driller's log for that well. No water level data are available for S28-E0. Water levels currently are being measured routinely in S31-1.

Water quality data for each of the three wells are tabulated in Figure 5A-5. Drinking water standards for selected constituents also are shown. When a 'less-than' flag (<) appears after the sample date, this indicates the results are below the detection limit, which is shown in the analysis value column. For some results, the current detection limit shown is lower than the detection limit in place at the time of analysis. None of the wells currently contain water samples that exceed drinking water standards (40 CFR 265.92). While some radionuclide activity is measurable, no activity exceeds drinking water standards. Currently, all samples were below maximum contaminant levels.

Currently available groundwater data are insufficient to fully evaluate the potential for groundwater contamination as a result of HPADS operations. However, given the nature of operations and the absence of appreciable liquid waste disposal, none is expected.

5A.3 GEOLOGIC CHARACTERISTICS

The HPADS is located approximately 2.4 miles (3.9 kilometers) west of the Horn Rapids Landfill entrance. It is situated at an elevation of approximately 452 feet (137.8 meters) above mean sea level, between the Yakima and Columbia Rivers, which are at elevations of approximately 370 feet (172.8 meters) and 340 feet (103.6 meters), respectively. The land surface slopes generally to the southwest toward the Yakima River and to the east toward the Columbia River. Longitudinal dunes in the HPADS area trend southwest-to-northeast and are on the order of 10 feet (3.0 meters). The dunes are locally active, but for the most part, the dunes have been stabilized by vegetation or have been reworked as a result of grading and excavation for onsite activities.

The principal structural feature is the Pasco Basin, which is one of several sediment-filled basins in the Central Columbia Plateau. The sediments in the Pasco Basin, as well as of the entire Columbia Plateau, are underlain by the Miocene age Columbia River Basalt Group. The sediments overlying the basalts, from the basalts upward, include (1) the Ringold Formation; (2) glaciofluvial deposits of the Hanford formation, which include Pasco gravels and touchet beds; and (3) surficial eolian sediments and basalts.

Ringold Formation. This formation in the Pasco Basin ranges in age from 8.5 to 3.9 million years before present (DOE-RL 1988a). The Ringold Formation directly overlies the uppermost basalt flows of the Columbia River Basalt Group. The Ringold Formation is a fluvial sedimentary unit that exhibits lateral facies variations. Major facies of the Ringold Formation include the main river channel facies, overbank facies, and fanglomerate facies. Because of facies variations and limited data, the stratigraphic relationship between

Ringold units observed in the 3000, 300, and 1100 Areas, and well-studied sections in the western Pasco Basin, is not completely known.

Newcomb (1958) divided the Ringold Formation into three members, based on exposures at the type section along the southern end of the White Bluffs (located along the Columbia River on the east side of the Hanford Site). These are a "lower blue clay member", a "middle conglomerate member", and an "upper member". The "lower blue clay member" (now called the lower Ringold unit) is known to overlie a thin basal Ringold unit composed of clayey to gravelly sand. The lower unit is generally a clay or silt that often contains sandy or gravelly layers (Newcomb et al. 1972). The middle Ringold unit is generally a sandy gravel, with local sand or silt lenses. The upper Ringold unit, found mainly in the White Bluffs area to the north and across the Columbia River from the 300 Area, is composed mainly of fine sand and silt.

Hanford Formation. Overlying the Ringold Formation are mostly coarse-grained deposits, belonging to the Hanford formation. The Hanford formation is composed of deposits derived from the sudden release of Pleistocene-age ice-dammed lakes located north and east of the Columbia Plateau. The earliest floods occurred less than 800,000 years before present (Bjornstad et al. 1987); the last flood occurred approximately 13,000 years before present (Mullineaux et al. 1979). Within the Pasco Basin, these floods incised into and stripped away much of the Ringold Formation.

Flood gravels consist of very coarse, sandy, cobble-boulder gravel within and adjacent to the main flood channels. Elsewhere, in areas marginal to flood channels, such as the western portion of the 300 Area, it appears that finer grained deposits consisting of pebbly gravels and sand were deposited.

The boundary between the Ringold and Hanford formations under the HPADS appears to be gradational, both in lithologic as well as hydrologic properties. In general, flood gravels of the Hanford formation can be differentiated from coarse-grained Ringold deposits by (1) less consolidation, (2) less alteration, (3) poorer sorting, and (4) higher percentages of angular basalt clasts. However, the contact is indistinct where flood gravels overlie coarse-grained Ringold facies, because sediment transported along the bases of flood channels consisted of mostly reworked deposits of the easily erodible Ringold Formation. Based on borehole cuttings alone, it is extremely difficult to differentiate between reworked and intact portions of the Ringold Formation.

Eolian Deposits. Overlying the Hanford Formation within the HPADS is a thin veneer of fine- to coarse-grained eolian sand deposits. The thickness of this unit is quite varied, ranging from 0 to 15 feet (0 to 4.6 meters). Eolian sand generally is lacking in areas where the surface has been disturbed by man. The contact between the eolian deposits and the Hanford Formation is well defined.

Geologic data obtained from the driller's logs for wells S31-1 and S28-E0 are limited. At the time the wells were drilled, general lithologic data were recorded by the driller and not by a trained geologist. Therefore, lithologic information is ambiguous. Because of the relative location of the

HPADS to the 1100 and 300 Areas, it is reasonable to assume that the HPADS have similar hydrogeologic and geologic features.

5A.4 GEOHYDROLOGIC CHARACTERISTICS

Groundwater beneath the area around the HPADS occurs in confined aquifers within the basalt sequence and lower Ringold, the unconfined aquifer of the Pasco gravels, and the sands and gravels of the Ringold Formation. The boundary between the confined and unconfined aquifers is typically the lowermost silt and clay member of the Ringold Formation (Lindberg and Bond 1979). A confined aquifer might exist in gravel layers beneath this silt/clay member, immediately above the basalt. The depth to the water table in the vicinity of the HPADS is approximately 85 feet (25.9 meters). Because of lateral facies variation, silt or clay lenses in the Ringold Formation might function as aquitards on a local scale. Perched or semiperched water conditions also might occur locally.

The unconfined aquifer in the area exhibits relatively high permeability, particularly in the Pasco gravels. Aquifer pumping test and numerical groundwater modeling for the 300 Area indicate transmissivities greater than 100,000 square feet (9,290 square meters) per day (Lindberg and Bond 1979). The storativity of the unconfined aquifer has been estimated at 0.1 in hydrologic studies of the 300 Area (Lindberg and Bond 1979). Aquifer tests conducted in the north Richland well field (ICF 1987) indicate a transmissivity of 86,000 square feet (7,989 square meters) per day, and storativity of 0.11. No measurements of these parameters other than hydraulic properties of the aquifers beneath the HPADS are available. However, available data suggest that hydrologic properties of the HPADS might be similar to those of the 1100 Area.

Water table maps for the Hanford Site indicate that within the vicinity of the HPADS, the water table dips east-northeast and ranges in elevation from 370 to 375 feet (112.8 to 114.3 meters) above mean sea level (Figure 5A-6). Regional groundwater flow in the HPADS is thought to be generally west to east, and controlled by the elevation difference between the Yakima and Columbia Rivers. The Yakima River is recharging the unconfined aquifer, which in turn discharges to the Columbia River. There are a number of factors that might complicate this relatively simple description:

- Spatial differences in hydraulic conductivity of the unconfined aquifer
- The river stage of both the Yakima and Columbia Rivers
- Infiltration to the unconfined aquifer from irrigation
- Upward leakage (discharge) from the confined aquifer to the lower part of the unconfined aquifer

- A water table that sometimes lies within the higher permeability Pasco gravels and in other areas within the lower permeability Ringold Formation.

Given the heterogeneity of both the Pasco gravels and the Ringold Formation, together with the various recharge/discharge points and seasonal variations in withdrawal, the groundwater flow conditions in the HPADS closure areas are likely to be complex, and direction and rate of groundwater flow are likely to change with time.

5A.5 POTENTIAL MIGRATION

No soil data currently exist (beyond Appendix 3A) to establish whether or not mobile residues from demolition events are present. Transport of potential residues might occur by (1) infiltration of precipitation, (2) extreme floods of the Yakima and Columbia Rivers, (3) or unreported liquid waste disposal.

Precipitation for the Hanford Site is measured at the Hanford Meteorological Station. The average annual precipitation at the Hanford Meteorological Station is 6.3 inches (16 centimeters). The total annual precipitation ranges (98 percentile) from 3.15 to 11 inches (8 to 28 centimeters). Most of the precipitation takes place during the winter, with nearly half of the annual amount occurring in the months of November through February. Days with greater than 0.5 inch (1.3 centimeter) of precipitation occur less than 1 percent of the year. Rainfall intensities of 1 inch (2.54 centimeter) for 1 hour are expected only once every 500 years. Winter monthly average snowfall ranges from 0.3 inch (0.8 centimeter) in March to 5.3 inches (13.5 centimeters) in January. The record snowfall of 24.4 inches (62 centimeters) occurred in February 1916, but the second highest snowfall is less than half this amount (DOE 1987). To date, the very small amount of precipitation in the region has not been proven to be capable of driving contaminants to the water table.

Average annual pan evaporation exceeds 60 inches (152.4 centimeters). Average annual lake evaporation ranges from 39 to 41 inches (99.1 to 104.1 centimeters). Actual evapotranspiration is essentially equivalent to annual precipitation (Leonhart 1979). Because potential evapotranspiration greatly exceeds significant annual precipitation, it is unlikely that precipitation promotes movement of contaminants to groundwater. For further information on the current state of knowledge regarding infiltration of precipitation on the Hanford Site, refer to Rockhold et al. (1990) and Smoot et al. (1989).

The 100-year flood event is another possible mechanism for transport of mobile residues. Figure 5A-7 shows the highest floods on record and probable maximum floods. During probable maximum flooding, the HPADS closure areas would not be inundated by floodwaters. Thus, flooding would not affect the HPADS (Figure 5A-7).

As described in the closure plan, there is no recollection of any liquid waste disposal within the closure sites. The only known item that is buried at the site is a 5-gallon (18.9-liter) container of napalm-B, which did not detonate after numerous ignitions. The container was buried somewhere nearby the HPADS and according to the closure plan, ground-penetrating radar will be used to locate the buried container. The 1100-EM-1 Operable Unit work plan contains CERCLA information about the Hanford Patrol Academy area (DOE-RL 1988a).

5A.6 SUMMARY

Existing groundwater data provide very limited information concerning possible groundwater contamination within the area of the closure sites. Two wells located near the closure sites are not directly within the apparent flow path under the closure sites, and therefore, are not the best indicators for closure area groundwater contaminants.

Process knowledge, as described in the closure plan, indicates no free liquids have been released to the soil in the closure areas, thus reducing the likelihood of contaminants within the groundwater. The 5-gallon (18.9-liter) canister of napalm-B buried in the relative proximity of the closure areas has little likelihood of impacting groundwater.

The available groundwater data do not suggest contamination attributable to the HPADS. The description of activities at the HPADS also suggests a low potential for contamination of the uppermost aquifer. The results of planned soil sampling activities, as described in the closure plan, will help to evaluate the potential for groundwater contamination.

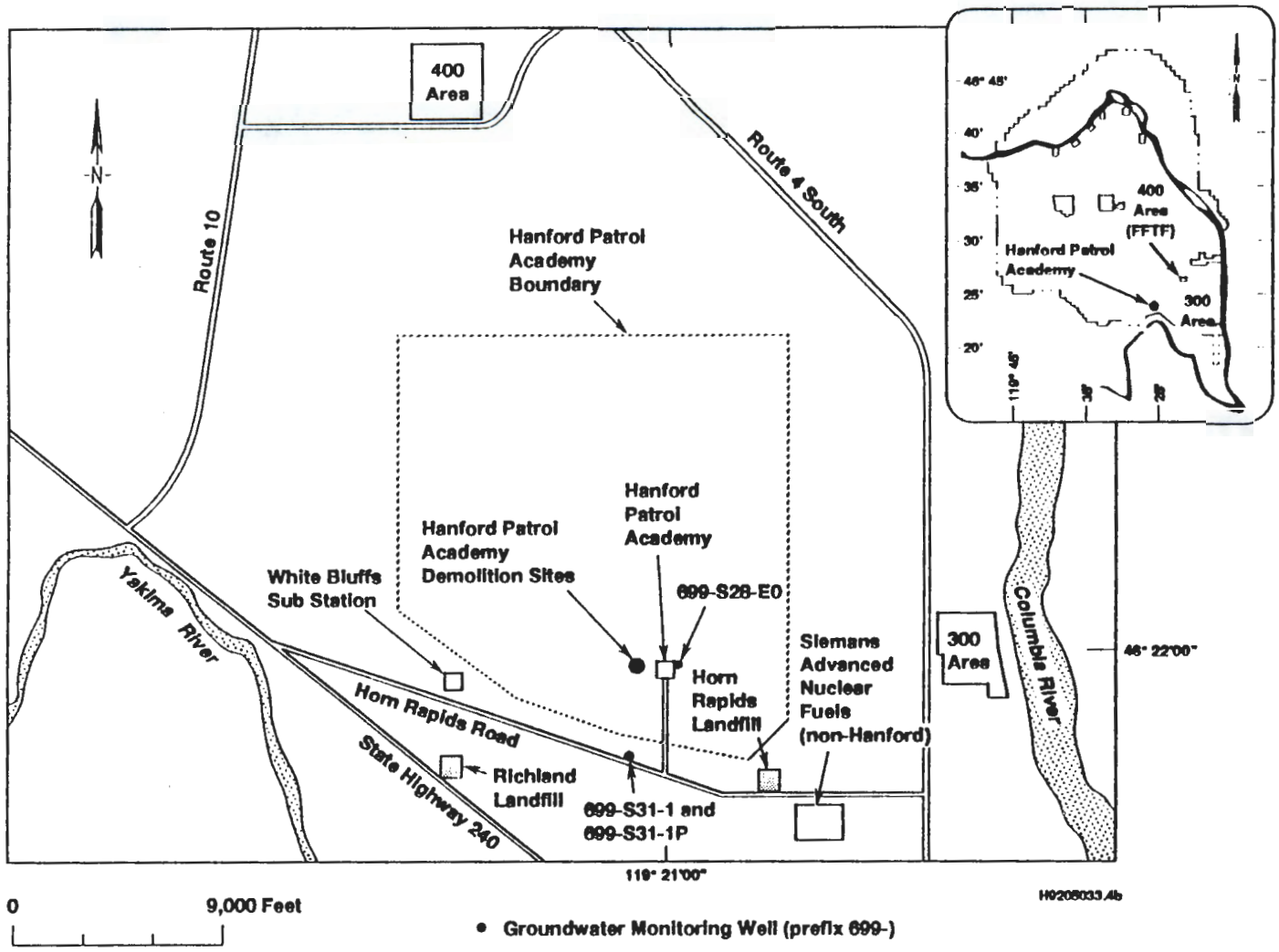

Figure 5A-1. Well Locations.

WELL SUMMARY SHEET

Boring or Well No. **699-S31-1 and 1P**
South 30600.00 West 725.00
Sheet 1 of 1

Location: Hanford Patrol Academy
Project: HPA Demolition Site; RCRA Closure Plan
Elevation (casing): 460.11
Drilling Contractor:
Driller: Stanberty, Robinson
Drilling Method and Equipment: Cable Tool
Prepared by: (Sign/Print Name)
Reviewed By: (Sign/Print Name)
Date:

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Well Construction		Graphic Log	Lithologic Description
		10		0-21' SAND.
		20		21-128' Sandy GRAVEL.
		30		
		40		
		50		
		60		
		70		
Water table 1992 (83.9') in S31-1.		80		
		90		
Perforated 8" casing from 93 to 103'.		100		
		110		
		120		
		130		128-132' Gravelly SAND.
		140		132-148' Slightly Gravelly SAND.
Top of cement seal uncertain.		150		148-185' Sandy GRAVEL.
4" casing cemented from 142 (?) to 177.4', (S31-P).		160		
		170		
		180		
		190		185-221' SILT.
		200		
		210		
		220		221-228' BASALT
TD = 228' 8" casing set at 228'. Drilled 1/51.		230		
			C/Z S P C/B	

Figure 5A-2. Well Summary for 6-531-1 and 6-531-1P.

WELL SUMMARY SHEET

Boring or Well No. 699-S28-E0
South 28072.00 West 189.00
Sheet 1 of 1

Location: Hanford Patrol Academy
Project: HPA Demolition Site; RCRA Closure Plan
Elevation (casing): 448.45
Drilling Contractor:
Driller:
Drilling Method and Equipment: Cable Tool
Prepared by: (Sign/Print Name)
Reviewed By: (Sign/Print Name)
Date:

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Well Construction		Graphic Log	Lithologic Description
		10, 20, 30, 40, 50, 60, 70		0-75' SAND.
Water table estimated at 85' (no data available).		80, 90, 100		75-101' Sandy GRAVEL.
		110		101-110' Silty GRAVEL.
Perforated 8" casing from 90 to 180'.		120, 130, 140, 150, 160, 170, 180		110-187 Sandy GRAVEL.
		190, 200, 210, 220		187-223' SILT.
TD=236'. 8" casing set at 222'. Drilled 5/81.		230		223-234' BASALT Flow Top.
				234-236' BASALT.
			C/Z S P C/B	

Figure 5A-3. Well Summary for 6-528-E0.

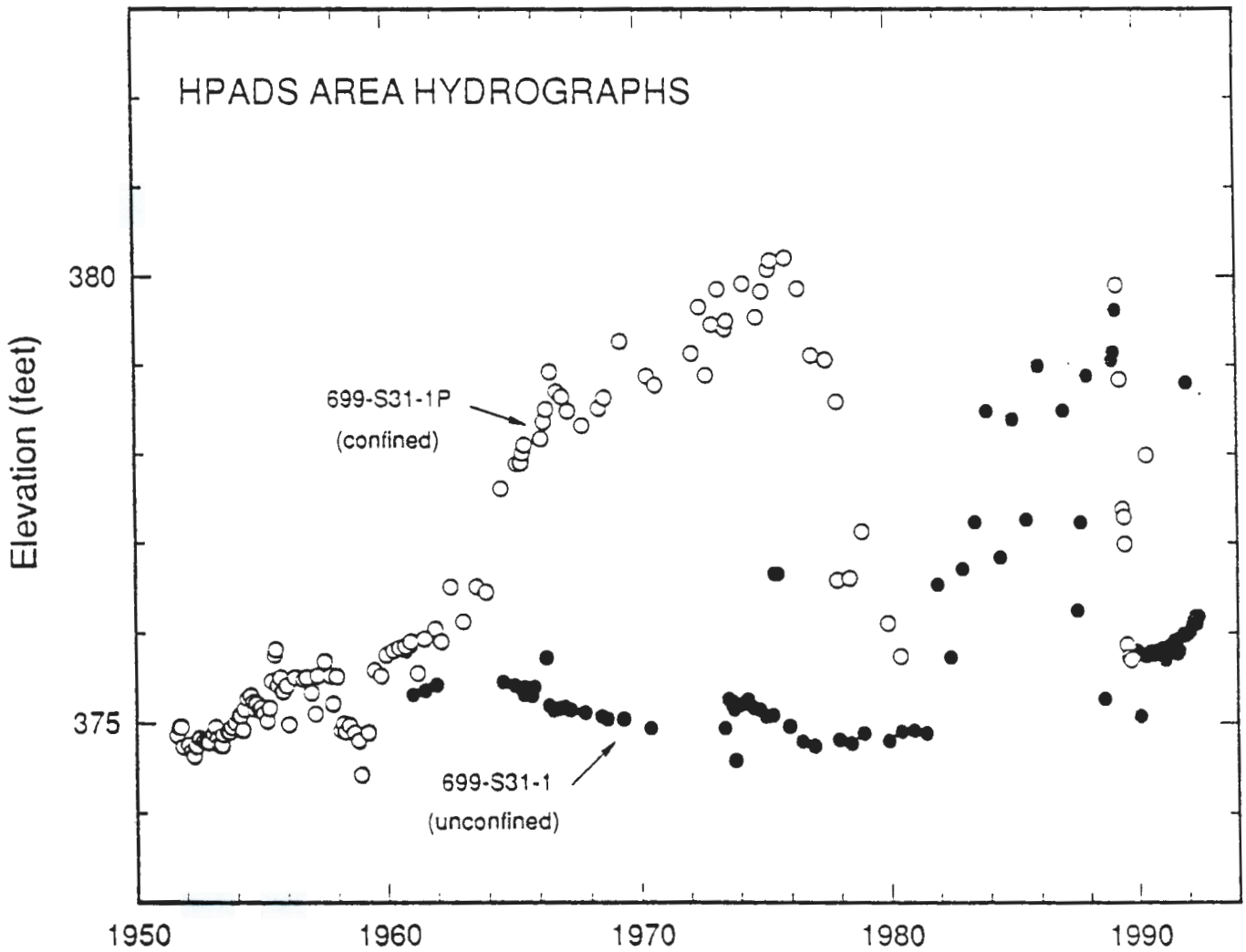

Figure 5A-4. Hydrographs for Wells 6-531-1 and 6-531-1P.

Geosciences Group PARADOX Database

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S28-E0	Alpha, High Detection Level	PCI/L	4.0	15.0	4/07/89	<	.4
					10/20/89		1.7
	Bromide	PPB	1000.0		5/04/92	U	500.0
	Chloride	PPB	500.0	250000.0	5/04/92		9700.0
	Fluoride	PPB	500.0	4000.0	5/04/92		300.0
	Gross alpha	PCI/L	4.0	15.0	1/10/86		1.7
					5/29/86		2.0
					7/09/86		2.0
					10/30/86		4.1
					1/26/87		2.0
					6/03/87		1.7
					7/24/87		1.9
					10/25/87		1.8
					2/17/88		1.5
					4/15/88		1.5
					7/21/88		1.1
					11/16/88		1.4
					1/20/89	<	.2
	Gross beta	PCI/L	8.0	50.0	1/10/86		6.8
					5/29/86		4.7
					7/09/86		3.4
					10/30/86		4.8
					1/26/87		5.8
					6/03/87		8.2
					7/24/87		6.0
					10/25/87		5.9
					2/17/88		5.5
					4/15/88		4.2
					7/21/88		3.6
					11/16/88		3.4
					1/20/89		3.1
					4/07/89		3.3
					10/20/89		4.6
	Iodine-129 (Drinking Water Sta	PCI/L	1.0	1.0	7/21/88	<	.0
	Nitrate	PPB	500.0	45000.0	10/30/86		10900.0
					1/26/87		10600.0
					6/03/87		10100.0
					5/04/92		9200.0
	Nitrate, High Detection Level	PPB	2500.0	45000.0	7/24/87		9640.0
					10/25/87		10500.0
					2/17/88		8990.0
					4/15/88		8690.0
					7/21/88		8400.0
					11/16/88		9800.0

Figure 5A-5. Water Quality Data. (sheet 1 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S28-E0	Nitrate, High Detection Level	PPB	2500.0	45000.0	1/20/89		10300.0
					4/07/89		9500.0
					10/20/89		9000.0
	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	1/10/86		9.7
					5/29/86		1.7
					7/09/86		8.7
	Nitrate-Ion	MG/L	.5	45.0	3/15/84		11.0
					1/07/85		24.0
					2/04/85		20.0
					4/19/85		19.0
					10/26/85		42.0
					12/30/85		82.0
	Nitrite	PPB	1000.0	3300.0	5/04/92	U	200.0
	Phosphate	PPB	1000.0		5/04/92	U	400.0
	Plutonium-238	PCI/L	.1	1.6	2/01/91	U	-.0
	Plutonium-239/40	PCI/L	.1	1.2	2/01/91	U	-.0
	Strontium-90	PCI/L	5.0	8.0	1/10/86	<	.2
					5/29/86	<	.8
					7/09/86	<	.0
					10/30/86	<	.4
					1/26/87	<	.0
					6/03/87	<	.3
					7/24/87	<	.2
					10/25/87	<	.0
					2/17/88	<	.4
					4/15/88	<	-.0
					7/21/88	<	-.2
					11/16/88	<	-.0
					1/20/89	<	-.2
					4/07/89	<	.2
					10/20/89	<	-.2
	Sulfate	PPB	500.0	250000.0	5/04/92		22000.0
	Technetium-99	PCI/L	15.0	900.0	2/01/91	U	.1
	Tritium	PCI/L	500.0	20000.0	3/15/84		-330.0
					1/07/85		180.0
					2/04/85		-320.0
					4/19/85		-12.0
					10/26/85		150.0
					12/30/85	<	120.0
					1/10/86	<	-41.9
					5/29/86	<	-112.0
					7/09/86	<	3.2
					10/30/86	<	98.2
					1/26/87	<	-62.3

Figure 5A-5. Water Quality Data. (sheet 2 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S28-E0	Tritium	PCI/L	500.0	20000.0	6/03/87	<	89.3
					7/24/87	<	-99.3
					10/25/87	<	85.9
					2/17/88	<	-164.0
					4/15/88	<	-167.0
					7/21/88	<	165.0
					11/16/88	<	-68.0
					1/20/89	<	-263.0
					4/07/89	<	-88.4
					10/20/89	<	-92.8
	Uranium	PCI/L	.5	40.0	4/19/85		30.0
					2/17/88		1.4
					4/15/88		1.4
					7/21/88		1.3
					11/16/88		.8
					4/07/89		1.4
					10/20/89		1.4
6-S31-1	1,1,1,2-tetrachlorethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,1,1-trichloroethane	PPB	5.0	200.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	1,1,2,2-tetrachlorethane	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,1,2-trichloroethane	PPB	5.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	1,1-dichloroethane	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,1-dichloroethylene	PPB	10.0	7.0	8/24/87	<	10.0
					8/04/88	<	10.0
	1,1-dimethylhydrazine	PPB	10.0		6/22/87	<	3000.0
	1,2,3,4-tetrachlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2,3,5-tetrachlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2,3-trichlorobenzene	PPB	10.0		7/18/86	<	10.0

Figure 5A-5. Water Quality Data. (sheet 3 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	1,2,3-trichlorobenzene	PPB	10.0		6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2,3-trichloropropane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,2,4,5-tetrachlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2,4-trichlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dibromo-3-chloropropane	PPB	10.0	.2	8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dibromoethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dichlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dichloroethane	PPB	5.0	5.0	8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dichloropropane	PPB	5.0	5.0	8/24/87	<	10.0
					8/04/88	<	10.0
	1,2-dimethylhydrazine	PPB	10.0		6/22/87	<	3000.0
	1,2-diphenylhydrazine	PPB	10.0		8/04/88	<	10.0
	1,3,5-trichlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,3-dichlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	1,3-dichloropropene	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,4-dichloro-2-butene	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	1,4-naphthoquinone	PPB	10.0		8/04/88	<	10.0
	1-chloro-2,3-epoxypropane	PPB	10.0		8/04/88	<	10.0
	1-naphthylamine	PPB	10.0		8/04/88	<	10.0
	2,3,4,6-tetrachlorophenol	PPB	10.0		8/04/88	<	10.0
	2,4,5-T	PPB	2.0		8/04/88	<	2.0

Figure 5A-5. Water Quality Data. (sheet 4 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	2,4,5-TP silvex	PPB	2.0	10.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	2.0
	2,4,5-Trichlorophenol	PPB	10.0		8/04/88	<	50.0
	2,4,6-trichlorophenol	PPB	10.0		8/04/88	<	10.0
	2,4-D	PPB	2.0	100.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	2.0
	2,4-dichlorophenol	PPB	10.0		8/04/88	<	10.0
	2,4-dimethylphenol	PPB	10.0		8/04/88	<	10.0
	2,4-dinitrophenol	PPB	10.0		8/04/88	<	50.0
	2,4-dinitrotoluene	PPB	10.0		8/04/88	<	10.0
	2,6-dichlorophenol	PPB	10.0		8/04/88	<	10.0
	2,6-dinitrotoluene	PPB	10.0		8/04/88	<	10.0
	2-acetylaminofluorene	PPB	10.0		8/04/88	<	10.0
	2-chloroethyl vinyl ether	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	2-chloronaphthalene	PPB	10.0		8/04/88	<	10.0
	2-chlorophenol	PPB	10.0		8/04/88	<	10.0
	2-cyclohexyl-4,6-dinitrophenol	PPB	10.0		8/04/88	<	10.0
	2-methyl-2-(methylthio) propio	PPB	10.0		8/04/88	<	10.0
	2-methylaziridine	PPB	10.0		8/04/88	<	10.0
	2-methyllactonitrile	PPB	10.0		8/04/88	<	10.0
	2-naphthylamine	PPB	10.0		8/04/88	<	10.0
	2-picoline	PPB	10.0		8/04/88	<	10.0
	2-propyn-1-ol	PPB	10000.0		6/22/87	<	3000.0
	2-sec-butyl-4,6-dinitrophenol	PPB	10.0		8/04/88	<	10.0
	3,3'-Dichlorobenzidine	PPB	10.0		8/04/88	<	20.0
	3,3'-dimethoxybenzidine	PPB	10.0		8/04/88	<	10.0
	3,3'-dimethylbenzidine	PPB	10.0		8/04/88	<	10.0
	3-chloropropionitrile	PPB	10000.0		6/22/87	<	3000.0
	3-methylcholanthrene	PPB	10.0		8/04/88	<	10.0
	4,4'-methylenebis(2-chloroanil	PPB	10.0		8/04/88	<	10.0
	4,6-dinitro-o-cresol and salts	PPB	10.0		8/04/88	<	10.0
	4-aminobyphenyl	PPB	10.0		8/04/88	<	10.0
	4-bromophenyl phenyl ether	PPB	10.0		8/04/88	<	10.0
	5-(aminomethyl)-3-isoxazolol	PPB	10.0		8/04/88	<	10.0
	5-nitro-o-toluidine	PPB	10.0		8/04/88	<	10.0
	7,12-dimethylbenz[a]anthracene	PPB	10.0		8/04/88	<	10.0
	7H-dibenzo[c,g]carbazole	PPB	10.0		8/04/88	<	10.0
	Acetonitrile	PPB	10.0		6/22/87	<	3000.0
					8/04/88	<	3000.0
	Acetophenone	PPB	10.0		8/04/88	<	10.0
	Acrolein	PPB	10.0		8/24/87	<	10.0

Figure 5A-5. Water Quality Data. (sheet 5 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Acrolein	PPB	10.0		8/04/88	<	10.0
	Acrylamide	PPB	10000.0		6/22/87	<	3000.0
	Acrylonitrile	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Aldrin	PPB	.1		8/04/88	<	.1
	Alkalinity		20000.0		6/22/87		89300.0
					8/24/87		91100.0
					8/04/88		94200.0
					12/20/91		97.0
	Allyl alcohol	PPB	10000.0		6/22/87	<	3000.0
	Alpha,alpha-dimethylphenethyla	PPB	10.0		8/04/88	<	10.0
	Alpha-BHC	PPB	.1	4.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	.1
	Aluminum	PPB	150.0	50.0	10/17/85	<	150.0
					8/04/88	<	150.0
	Aluminum, filtered	PPB	150.0	50.0	6/22/87	<	150.0
					8/24/87	<	150.0
					8/04/88	<	150.0
	Amitrole	PPB	10.0		8/04/88	<	10.0
	Ammonium ion	PPB	50.0		6/22/87		70.0
					8/24/87	<	50.0
					8/04/88	<	50.0
	Aniline	PPB	10.0		8/04/88	<	10.0
	Antimony	PPB	100.0		10/17/85	<	100.0
					8/04/88	<	100.0
	Antimony, filtered	PPB	100.0		6/22/87	<	100.0
					8/24/87	<	100.0
					8/04/88	<	100.0
					12/20/91	U	200.0
	Aramite	PPB	10.0		8/04/88	<	10.0
	Arochlor 1016	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1221	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1232	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1242	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1248	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1254	PPB	1.0	.5	8/04/88	<	1.0
	Arochlor 1260	PPB	1.0	.5	8/04/88	<	1.0
	Arsenic	PPB	5.0	50.0	10/17/85	<	5.0
					8/04/88		6.0
	Arsenic, filtered	PPB	5.0	50.0	6/22/87	<	5.0
					8/24/87		6.0
					8/04/88		6.0
	Auramine	PPB	10.0		8/04/88	<	10.0

Figure 5A-5. Water Quality Data. (sheet 6 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Barium	PPB	6.0	1000.0	10/17/85		12.0
					8/04/88		12.0
	Barium, filtered	PPB	6.0	1000.0	6/22/87		19.0
					8/24/87		19.0
					8/04/88	<	6.0
					12/20/91	U	20.0
	Benz[a]anthracene	PPB	10.0		8/04/88	<	10.0
	Benz[c]acridine	PPB	10.0		8/04/88	<	10.0
	Benzene	PPB	5.0	5.0	7/18/86	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Benzene, dichloromethyl	PPB	10.0		8/04/88	<	10.0
	Benzenethoil	PPB	10.0		8/04/88	<	10.0
	Benzidine	PPB	10.0		8/04/88	<	10.0
	Benzo[a]pyrene	PPB	10.0		8/04/88	<	10.0
	Benzo[b]fluoranthene	PPB	10.0		8/04/88	<	10.0
	Benzo[j]fluoranthene	PPB	10.0		8/04/88	<	10.0
	Benzyl chloride	PPB	10.0		8/04/88	<	10.0
	Beryllium	PPB	5.0		8/04/88	<	5.0
	Beryllium, filtered	PPB	5.0		6/22/87	<	5.0
					8/24/87	<	5.0
					8/04/88	<	5.0
					12/20/91	U	3.0
	Beta-BHC	PPB	.1	4.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	.1
	Bis(2-chloroethoxy) methane	PPB	10.0		8/04/88	<	10.0
	Bis(2-chloroethyl) ether	PPB	10.0		8/04/88	<	10.0
	Bis(2-chloroisopropyl)ether	PPB	10.0		8/04/88	<	10.0
	Bis(2-ethylhexyl) phthalate	PPB	10.0		7/18/86		22.0
					8/04/88	<	10.0
	Bis(chloromethyl) ether	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Bismuth	PPB	5.0		8/24/87	<	5.0
	Bromide	PPB	1000.0		12/20/91	U	500.0
	Bromoacetone	PPB	5.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Bromoform	PPB	5.0	100.0	8/24/87	<	10.0
					8/04/88	<	10.0
	Butyl benzyl phthalate	PPB	10.0		8/04/88	<	10.0
	Cadmium	PPB	2.0	10.0	10/17/85	<	2.0
					8/04/88	<	2.0
	Cadmium, filtered	PPB	2.0	10.0	6/22/87	<	2.0
					8/24/87	<	2.0

Figure 5A-5. Water Quality Data. (sheet 7 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Cadmium, filtered	PPB	2.0	10.0	8/04/88	<	2.0
					12/20/91	U	10.0
	Calcium	PPB	50.0		8/04/88		28000.0
	Calcium, filtered	PPB	50.0		6/22/87		27400.0
					8/24/87		22700.0
					8/04/88		29100.0
					12/20/91		29000.0
	Carbon Tetrachloride by GC/MS	PPB	5.0	5.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Carbon disulfide	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Carbophenothion	PPB	2.0		8/04/88	<	2.0
	Chemical sodium by AA	MG/L	1.0		3/01/59		27.0
					4/01/59		27.0
					7/01/59		27.0
	Chloral	PPB	3000.0		6/22/87	<	3000.0
	Chlordane	PPB	1.0	2.0	8/04/88	<	1.0
	Chloride	PPB	500.0	250000.0	10/17/85		4680.0
					6/22/87		5540.0
					8/24/87		5330.0
					8/04/88		5120.0
					12/20/91		5200.0
	Chlornaphazine	PPB	10.0		8/04/88	<	10.0
	Chloroacetaldehyde	PPB	16000.0		6/22/87	<	3000.0
	Chloroalkyl ethers	PPB	10.0		8/04/88	<	10.0
	Chlorobenzene	PPB	5.0	100.0	8/24/87	<	10.0
					8/04/88	<	10.0
	Chlorobenzilate	PPB	300.0		10/17/85	<	100.0
					8/04/88	<	30.0
	Chloroform	PPB	5.0	100.0	6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Chloromethyl methyl ether	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Chromium	PPB	10.0	50.0	10/17/85	<	10.0
					8/04/88	<	10.0
	Chromium, filtered	PPB	10.0	50.0	6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
					12/20/91	U	20.0
	Chrysene	PPB	10.0		8/04/88	<	10.0
	Cobalt, filtered	PPB	20.0		12/20/91	U	20.0

Figure 5A-5. Water Quality Data. (sheet 8 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Cobalt-60	PCI/L	22.5	100.0	11/27/84		-.6
	Coliform bacteria	MPN	2.2	1.0	10/17/85	<	3.0
	Conductivity, Laboratory	UMHO	1.0	700.0	12/20/91		250.0
	Copper	PPB	10.0	1000.0	10/17/85	<	10.0
					8/04/88	<	10.0
	Copper, filtered	PPB	10.0	1000.0	6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
					12/20/91	U	20.0
	Cresols	PPB	10.0		8/04/88	<	10.0
	Crotonaldehyde	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Cyanide	PPB	10.0		6/22/87	<	10.0
					8/24/87	<	10.0
	Cyanogen	PPB	3000.0		6/22/87	<	3000.0
	Cyanogen bromide	PPB	3000.0		6/22/87	<	3000.0
	Cyanogen chloride	PPB	3000.0		6/22/87	<	3000.0
	DDD	PPB	.1		8/04/88	<	.1
	DDE	PPB	.1		8/04/88	<	.1
	DDT	PPB	.1		8/04/88	<	.1
	Delta-BHC	PPB	.1	4.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	.1
	Di-n-butyl phthalate	PPB	10.0		8/04/88	<	10.0
	Di-n-octyl phthalate	PPB	10.0		8/04/88	<	10.0
	Di-n-propylnitrosamine	PPB	10.0		8/04/88	<	10.0
	Dibenz[a,h]acridine	PPB	10.0		8/04/88	<	10.0
	Dibenz[a,h]anthracene	PPB	10.0		8/04/88	<	10.0
	Dibenz[a,j]acridine	PPB	10.0		8/04/88	<	10.0
	Dibenzo[a,e]pyrene	PPB	10.0		8/04/88	<	10.0
	Dibenzo[a,h]pyrene	PPB	10.0		8/04/88	<	10.0
	Dibenzo[a,i]pyrene	PPB	10.0		8/04/88	<	10.0
	Dibromomethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Dichlorodifluoromethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Dichloropropanol	PPB	3000.0		6/22/87	<	3000.0
	Dieldrin	PPB	.1		8/04/88	<	.1
	Diethyl phthalate	PPB	10.0		8/04/88	<	10.0
	Diethylarsine	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Dihydrosafrole	PPB	10.0		8/04/88	<	10.0
	Dimethoate	PPB	2.0		8/04/88	<	2.0
	Dimethyl phthalate	PPB	10.0		8/04/88	<	10.0

Figure 5A-5. Water Quality Data. (sheet 9 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Dinitrobenzene	PPB	10.0		8/04/88	<	10.0
	Dioxane	PPB	500.0		7/18/86	<	500.0
					8/24/87	<	500.0
					8/04/88	<	500.0
	Diphenylamine	PPB	10.0		8/04/88	<	10.0
	Disulfoton	PPB	2.0		8/04/88	<	2.0
	Endosulfan I	PPB	.1		8/04/88	<	.1
	Endosulfan II	PPB	.1		8/04/88	<	.1
	Endrin	PPB	.1	.2	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	.1
	Ethyl carbamate	PPB	10000.0		6/22/87	<	3000.0
	Ethyl cyanide	PPB	10000.0		6/22/87	<	3000.0
	Ethyl methacrylate	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Ethyl methanesulfonate	PPB	10.0		8/04/88	<	10.0
	Ethylene glycol	PPB	10000.0		8/04/88	<	10000.0
	Ethylene oxide	PPB	10.0		6/22/87	<	3000.0
					8/04/88	<	3000.0
	Ethyleneimine	PPB	10.0		8/04/88	<	10.0
	Fluoranthene	PPB	10.0		8/04/88	<	10.0
	Fluoride	PPB	500.0	4000.0	10/17/85	<	500.0
					6/22/87	<	500.0
					8/24/87	<	500.0
					8/04/88	<	500.0
					12/20/91		200.0
	Fluoride, Low Detection Level	PPB	20.0	4000.0	8/24/87		250.0
	Fluoroacetic acid	PPB	3000.0		6/22/87	<	3000.0
	Formalin	PPB	500.0		7/18/86	<	500.0
					8/24/87	<	500.0
					8/04/88	<	500.0
	Gamma-BHC	PPB	.1	4.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	.1
	Glycidylaldehyde	PPB	3000.0		6/22/87	<	3000.0
	Gross alpha	PCI/L	4.0	15.0	10/17/85		1.2
					6/22/87	<	.7
					8/24/87	<	.2
	Gross beta	PCI/L	8.0	50.0	11/01/51		4.2
					1/01/52		8.0
					2/01/52		24.0
					3/01/52		23.0
					4/01/52		13.0
					9/01/52		.4

Figure 5A-5. Water Quality Data. (sheet 10 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Gross beta	PCI/L	8.0	50.0	12/01/52		4.7
					5/01/53		15.0
					8/01/53		22.0
					12/01/53		12.0
					1/01/54		78.0
					3/01/54		21.0
					6/01/54		7.6
					8/01/54		11.0
					3/01/55		23.0
					5/01/55		24.0
					1/01/56		8.2
					3/01/59		200.0
					4/01/59		200.0
					5/01/59		200.0
					7/01/59		200.0
					11/15/60		240.0
					7/21/66		280.0
					4/15/69		150.0
					5/14/69		150.0
					6/03/69		150.0
					7/17/69		150.0
					10/28/69		150.0
					10/17/85		6.3
					6/22/87		5.5
					8/24/87		5.7
	Heptachlor	PPB	.1	.4	8/04/88	<	.1
	Heptchlor epoxide	PPB	.1		8/04/88	<	.1
	Hexachlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Hexachlorobutadiene	PPB	10.0		8/04/88	<	10.0
	Hexachlorocyclopentadiene	PPB	10.0		8/04/88	<	10.0
	Hexachloroethane	PPB	10.0		8/04/88	<	10.0
	Hexachlorophene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Hexachloropropene	PPB	10.0		8/04/88	<	10.0
	Hydrazine	PPB	3000.0		6/22/87	<	3000.0
	Hydrazine, Low Detection Level	PPB	30.0		8/24/87	<	30.0
	Hydrogen sulfide	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Indeno(1,2,3-cd)pyrene	PPB	10.0		8/04/88	<	10.0

Figure 5A-5. Water Quality Data. (sheet 11 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Iodomethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Iron	PPB	30.0	300.0	10/17/85		146.0
					8/04/88		169.0
	Iron, filtered	PPB	30.0	300.0	6/22/87	<	50.0
					8/24/87	<	50.0
					8/04/88	<	30.0
					12/20/91	U	20.0
	Isobutyl alcohol	PPB	10000.0		6/22/87	<	3000.0
	Isosafrole	PPB	10.0		8/04/88	<	10.0
	Kerosene	PPB	10000.0		7/18/86	<	10000.0
					6/22/87	<	10000.0
					8/24/87	<	10000.0
					8/04/88	<	10000.0
	Lead	PPB	30.0		10/17/85	<	30.0
	Lead (graphite furnace)	PPB	5.0	50.0	8/04/88	<	5.0
	Lead, filtered	PPB	5.0	50.0	6/22/87	<	5.0
					8/24/87	<	5.0
					8/04/88	<	5.0
	Magnesium	PPB	50.0		8/04/88		6260.0
	Magnesium, filtered	PPB	50.0		6/22/87		6200.0
					8/24/87		5830.0
					8/04/88		5990.0
					12/20/91		6100.0
	Maleic hydrizide	PPB	500.0		8/04/88	<	500.0
	Malononitrile	PPB	10.0		8/04/88	<	10.0
	Manganese	PPB	5.0	50.0	10/17/85		5.0
					8/04/88	<	5.0
	Manganese, filtered	PPB	5.0	50.0	6/22/87	<	5.0
					8/24/87	<	5.0
					8/04/88	<	5.0
					12/20/91	U	10.0
	Melphalan	PPB	10.0		8/04/88	<	10.0
	Mercury	PPB	.1	2.0	10/17/85	<	.1
					8/04/88	<	.1
	Mercury, filtered	PPB	.1	2.0	6/22/87	<	.1
					8/24/87	<	.1
					8/04/88	<	.1
	Methacrylonitrile	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Methanethiol	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Methapyrilene	PPB	10.0		8/04/88	<	10.0
	Metholonyl	PPB	10.0		8/04/88	<	10.0

Figure 5A-5. Water Quality Data. (sheet 12 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Methoxychlor	PPB	3.0	100.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	3.0
	Methyl Isobutyl Ketone	PPB	10.0		8/04/88	<	10.0
	Methyl bromide	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Methyl chloride	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Methyl ethyl ketone	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Methyl hydrazine	PPB	3000.0		6/22/87	<	3000.0
	Methyl methacrylate	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Methyl methanesulfonate	PPB	10.0		8/04/88	<	10.0
	Methyl parathion	PPB	2.0		8/04/88	<	2.0
	Methylene Chloride	PPB	5.0		6/22/87		44.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Methylthiouracil	PPB	10.0		8/04/88	<	10.0
	N,N-diethylhydrazine	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	N-nitroso-N-methylurethane	PPB	10.0		8/04/88	<	10.0
	N-nitrosodi-n-butylamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosodiethanolamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosodiethylamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosodimethylamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosomethylethylamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosomethylvinylamine	PPB	10.0		8/04/88	<	10.0
	N-nitrosomorpholine	PPB	10.0		8/04/88	<	10.0
	N-nitrosonornicotine	PPB	10.0		8/04/88	<	10.0
	N-nitrosopiperidine	PPB	10.0		8/04/88	<	10.0
	N-propylamine	PPB	10000.0		6/22/87	<	3000.0
	Naphthalene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Nickel	PPB	10.0		10/17/85	<	10.0
					8/04/88	<	10.0
	Nickel, filtered	PPB	10.0		6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
					12/20/91	U	30.0

Figure 5A-5. Water Quality Data. (sheet 13 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Nicotinic acid	PPB	100.0		8/04/88	<	100.0
	Nitrate	PPB	500.0	45000.0	10/17/85		2860.0
					6/22/87		3430.0
					8/24/87		3480.0
					8/04/88		3620.0
					12/20/91		900.0
	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	10/28/57		1.0
					1/09/58		1.0
					2/12/58		1.0
					3/11/58		1.0
					4/09/58		1.0
					5/07/58		1.0
					12/11/58		1.0
					3/01/59		1.0
					4/01/59		1.0
					7/01/59		1.0
					5/18/61		.1
					8/17/61		.3
					12/21/61		.1
					2/07/62		.1
					8/02/62		5.0
					8/05/63		.1
					5/14/69		.2
					7/17/69		1.9
					10/28/69		.5
					6/06/72		4.3
					4/02/73		3.8
					8/30/73		.5
					2/28/74		25.0
					9/09/74		17.0
					1/03/75		.5
					5/01/75		.5
					7/01/75		.5
					11/04/75		3.7
					1/05/76		.5
					5/03/76		.5
					6/29/76		.5
					10/26/76		.5
					2/01/77		.5
					4/25/77		.5
					6/24/81		.5
					12/30/81		1.9
	Nitrate-Ion	MG/L	.5	45.0	11/27/84		32.0
	Nitrite	PPB	1000.0	3300.0	12/20/91	U	200.0

Figure 5A-5. Water Quality Data. (sheet 14 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Nitrobenzine	PPB	10.0		8/04/88	<	10.0
	Nitrosopyrrolidine	PPB	10.0		8/04/88	<	10.0
	O,O,O-triethyl phosphorothioat	PPB	10.0		8/04/88	<	10.0
	O-toluidine hydrochloride	PPB	10.0		8/04/88	<	10.0
	Osmium, filtered	PPB	300.0		6/22/87	<	300.0
					8/24/87	<	300.0
	P benzoquinone	PPB	10.0		8/04/88	<	10.0
	P-chloro-m-cresol	PPB	10.0		8/04/88	<	10.0
	P-chloroaniline	PPB	10.0		8/04/88	<	10.0
	P-dimethylaminoazobenzene	PPB	10.0		8/04/88	<	10.0
	P-nitroaniline	PPB	10.0		8/04/88	<	50.0
	Paraldehyde	PPB	10000.0		6/22/87	<	3000.0
	Parathion	PPB	2.0		8/04/88	<	2.0
	Pentachlorobenzene	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Pentachloroethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Pentachloronitrobenzene	PPB	10.0		8/04/88	<	10.0
	Pentachlorophenol	PPB	50.0	200.0	8/04/88	<	50.0
	Phenacetin	PPB	10.0		8/04/88	<	10.0
	Phenol	PPB	10.0		7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	Phenylenediamine	PPB	10.0		8/04/88	<	10.0
	Phosphate	PPB	1000.0		10/17/85	<	1000.0
					6/22/87	<	1000.0
					8/24/87	<	1000.0
					8/04/88	<	1000.0
					12/20/91	U	400.0
	Phthalic acid esters	PPB	10.0		8/04/88	<	10.0
	Potassium	PPB	100.0		10/17/85		3730.0
					8/04/88		4040.0
	Potassium, filtered	PPB	100.0		6/22/87		4280.0
					8/24/87		4110.0
					8/04/88		4350.0
					12/20/91		4000.0
	Pronamide	PPB	10.0		8/04/88	<	10.0
	Pyridine	PPB	500.0		7/18/86	<	500.0
					8/24/87	<	500.0
					8/04/88	<	500.0
	Radium	PCI/L	1.0	5.0	10/17/85	<	-.1

Figure 5A-5. Water Quality Data. (sheet 15 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Radium	PCI/L	1.0	5.0	6/22/87	<	.1
	Reserpine	PPB	10.0		8/04/88	<	10.0
	Resorcinol	PPB	10.0		8/04/88	<	10.0
	Safrol	PPB	10.0		8/04/88	<	10.0
	Selenium	PPB	5.0	10.0	10/17/85	<	5.0
					8/04/88	<	5.0
	Selenium, filtered	PPB	5.0	10.0	6/22/87	<	5.0
					8/24/87	<	5.0
					8/04/88	<	5.0
	Silver	PPB	10.0	50.0	10/17/85	<	10.0
					8/04/88	<	10.0
	Silver, filtered	PPB	10.0	50.0	6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
					12/20/91	U	20.0
	Sodium	PPB	200.0		10/17/85		8580.0
					8/04/88		9440.0
	Sodium, filtered	PPB	200.0		6/22/87		8990.0
					8/24/87		8500.0
					8/04/88		9060.0
					12/20/91		8900.0
	Specific conductance	UMHO	1.0	700.0	10/17/85		235.0
					6/22/87		220.0
					8/24/87		197.0
					8/04/88		220.0
	Strontium	PPB	10.0		8/04/88		128.0
	Strontium, filtered	PPB	10.0		6/22/87	<	300.0
					8/24/87	<	300.0
					8/04/88		110.0
	Strontium-90	PCI/L	5.0	8.0	11/01/60		14.0
	Strychnine	PPB	50.0		8/04/88	<	50.0
	Sulfate	PPB	500.0	250000.0	10/17/85		16500.0
					6/22/87		17700.0
					8/24/87		16600.0
					8/04/88		17200.0
					12/20/91		17000.0
	Sym-trinitrobenzene	PPB	10.0		8/04/88	<	10.0
	Tetrachloroethylene	PPB	5.0	5.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Tetraethylpyrophosphate	PPB	2.0		8/04/88	<	2.0
	Thallium	PPB	5.0		8/04/88	<	5.0
	Thallium, filtered	PPB	5.0		8/04/88	<	5.0

Figure 5A-5. Water Quality Data. (sheet 16 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Thiofanox	PPB	10.0		8/04/88	<	10.0
	Thiuram	PPB	10.0		8/04/88	<	10.0
	Tin, filtered	PPB	30.0		12/20/91	U	100.0
	Toluene	PPB	5.0	2000.0	7/18/86	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Toluenediamine	PPB	10.0		8/04/88	<	10.0
	Total Organic Halogen, Low Det	PPB	10.0		6/22/87		60.8
					8/24/87	<	5.6
					8/04/88	<	.9
	Total carbon	PPB	1000.0		8/24/87		37100.0
					8/04/88		20900.0
	Total organic carbon	PPB	1000.0		10/17/85		1500.0
					7/18/86		1000.0
					6/22/87		1380.0
					8/24/87		1190.0
					8/04/88	<	301.0
	Total organic halogen	PPB	100.0		10/17/85	<	2.7
					7/18/86	<	.8
	Toxaphene	PPB	1.0	5.0	10/17/85	<	1.0
					7/18/86	<	1.0
					8/04/88	<	1.0
	Trans-1,2-dichloroethene	PPB	5.0	70.0	8/24/87	<	10.0
					8/04/88	<	10.0
	Tributylphosphoric Acid	PPB	10.0		8/04/88	<	10.0
	Trichloroethylene	PPB	5.0	5.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Trichloromethanethiol	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Trichloromonofluoromethane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Trichloropropane	PPB	10.0		8/24/87	<	10.0
					8/04/88	<	10.0
	Tris(2,3-dibromopropyl) phosph	PPB	10.0		8/04/88	<	10.0
	Tritium	PCI/L	500.0	20000.0	9/27/66		3400.0
					12/14/66		2300.0
					6/15/67		3200.0
					9/08/67		2300.0
					12/04/67		1700.0
					2/05/69		490.0
					5/14/69		540.0
					1/03/75		700.0

Figure 5A-5. Water Quality Data. (sheet 17 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	Tritium	PCI/L	500.0	20000.0	5/01/75		740.0
					7/01/75		480.0
					11/04/75		1100.0
					1/05/76		950.0
					5/03/76		900.0
					6/29/76		910.0
					10/26/76		1100.0
					2/01/77		570.0
					4/25/77		1500.0
					6/24/81		2400.0
					12/30/81		710.0
					11/27/84		670.0
					8/04/88	<	-13.6
					12/20/91	U	-74.3
	Uranium, chemical	UG/L	.7	59.0	8/04/88		1.6
	Vanadium	PPB	5.0		10/17/85		12.0
					8/04/88		7.0
	Vanadium, filtered	PPB	5.0		6/22/87		15.0
					8/24/87		14.0
					8/04/88	<	5.0
					12/20/91	U	30.0
	Vinyl chloride	PPB	10.0	2.0	8/24/87	<	10.0
					8/04/88	<	10.0
	Warfarin	PPB	10.0		8/04/88	<	10.0
	Xylene-m	PPB	5.0	10000.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Xylene-o,p	PPB	5.0	10000.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	5.0
	Zinc	PPB	5.0	5000.0	8/04/88	<	5.0
	Zinc, filtered	PPB	5.0	5000.0	6/22/87	<	5.0
					8/24/87	<	5.0
					8/04/88	<	5.0
					12/20/91	U	10.0
	p-Dichlorobenzene	PPB	10.0	750.0	7/18/86	<	10.0
					6/22/87	<	10.0
					8/24/87	<	10.0
					8/04/88	<	10.0
	p-Nitrophenol	PPB	10.0		8/04/88	<	50.0
	pH, Field Measurement		.1	8.5	10/17/85		7.7
					6/22/87		7.3

Figure 5A-5. Water Quality Data. (sheet 18 of 24)

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1	pH, Field Measurement	.	.1	8.5	8/24/87		7.3
					8/04/88		7.7
	pH, Laboratory Measurement		.0	8.5	6/22/87		7.8
					8/24/87		7.9
					8/04/88		8.1
					12/20/91		8.0
6-S31-1P	1,1,1-trichloroethane	PPB	5.0	200.0	5/14/90	<	5.0
	1,1,2-trichloroethane	PPB	5.0		5/14/90	<	5.0
	1,1-dichloroethane	PPB	5.0		5/14/90	<	5.0
	1,2-dichloroethane	PPB	5.0	5.0	5/14/90	<	5.0
	Acetone by VOA	PPB	10.0		5/14/90	<	10.0
	Benzene	PPB	5.0	5.0	5/14/90	<	5.0
	Bicarbonate	MG/L	1.0		2/01/77		180.0
					12/04/78		150.0
					12/01/80		130.0
					1/03/83		70.0
					12/12/83		82.0
	Boron (Colorimetric by curcumi	UG/L	.0		2/01/77		.1
					12/01/80		.2
					1/03/83		.1
					12/12/83		.2
	Carbon Tetrachloride by GC/MS	PPB	5.0	5.0	5/14/90	<	5.0
	Carbonate	MG/L	1.0		2/01/77		0.0
					12/04/78		2.5
					12/01/80		1.8
					1/03/83		1.3
					12/12/83		1.6
	Chemical calcium by AA	MG/L	.5		2/01/77		26.0
					12/04/78		35.0
					12/01/80		22.0
					1/03/83		30.0
					12/12/83		25.0
	Chemical sodium by AA	MG/L	1.0		2/01/77		31.0
					12/04/78		33.0
					12/01/80		32.0
					1/03/83		9.3
					12/12/83		7.6
	Chloride by chemical analysis	MG/L	.1	250.0	2/01/77		4.3
					12/04/78		13.0
					12/01/80		4.8
					1/03/83		6.0
					12/12/83		4.9
	Chloroform	PPB	5.0	100.0	5/14/90	<	5.0

Figure 5A-5. Water Quality Data. (sheet 19 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P	Gross alpha	PCI/L	4.0	15.0	2/19/88	1.2
					8/04/88	.9
					1/20/89	< .6
	Gross beta	PCI/L	8.0	50.0	1/25/67	220.0
					2/15/67	880.0
					3/21/67	19000.0
					4/11/67	150.0
					5/03/67	6000.0
					6/15/67	270.0
					7/12/67	140.0
					10/03/67	160.0
					10/30/67	480.0
					12/04/67	140.0
					2/05/68	4.0
					3/04/68	43.0
					3/08/68	110.0
					3/26/68	13.0
					5/06/68	7.0
					6/05/68	450.0
					6/12/68	150.0
					7/19/68	110.0
					8/05/68	74.0
					9/17/68	46.0
					9/30/68	170.0
					11/04/68	150.0
					12/16/68	150.0
					1/28/69	160.0
					2/05/69	150.0
					3/03/69	180.0
					4/15/69	150.0
					5/14/69	150.0
					6/03/69	150.0
					7/17/69	150.0
					7/28/69	160.0
					10/28/69	150.0
					2/19/88	4.4
					8/04/88	3.7
					1/20/89	< 1.3
	Hardness	MG/L			1/03/83	83.0
	Magnesium by chemical analysis	MG/L	.3		2/01/77	9.3
					12/04/78	10.0
					12/01/80	9.3
					1/03/83	6.9
					12/12/83	7.6

Figure 5A-5. Water Quality Data. (sheet 20 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1P	Methyl Isobutyl Ketone	PPB	10.0		5/14/90	<	10.0
	Methyl ethyl ketone	PPB	10.0		5/14/90	<	10.0
	Methylene Chloride	PPB	5.0		5/14/90	<	5.0
	Nitrate	PPB	500.0	45000.0	8/13/86		3450.0
					11/20/86		3220.0
	Nitrate, High Detection Level	PPB	2500.0	45000.0	2/19/88		3230.0
					8/04/88		3020.0
					1/20/89		4000.0
					5/14/90		2500.0
	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	12/04/67		1.0
					1/05/68		.2
					3/26/68		.1
					8/05/68		.6
					11/04/68		1.7
					2/05/69		.1
					5/14/69		.2
					7/17/69		1.9
					10/28/69		.5
					1/03/75		.5
					5/01/75		.5
					7/01/75		.5
					11/04/75		3.7
					1/05/76		.5
					5/03/76		.5
					6/29/76		.5
					10/26/76		.5
					2/01/77		.5
					4/25/77		.5
					7/28/77		.5
					10/31/77		.5
					1/11/78		.5
					3/21/78		.5
					6/22/78		.5
					9/15/78		1.0
					1/09/79		.5
					6/12/79		.5
					9/05/79		.5
					1/04/80		.5
					6/09/80		.5
					9/12/80		.5
					1/06/81		.5
					3/26/81		2.2
					3/22/82		1.2
					6/23/82		1.4

Figure 5A-5. Water Quality Data. (sheet 21 of 24)

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HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1P	Nitrate, Phenodisulfonic Acid	MG/L	.5	45.0	9/16/82		.9
					1/03/83		1.6
					3/15/83		1.7
					6/06/83		1.6
					8/31/83		1.6
					12/12/83		1.7
	Nitrate-Ion	MG/L	.5	45.0	4/13/84		4.5
					6/29/84		4.4
					9/28/84		4.9
					2/04/85		7.4
					7/18/85		14.0
					10/17/85		11.0
					11/26/85		36.0
					2/24/86		13.0
					6/17/86		9.2
	Specific conductance	UMHO	1.0	700.0	2/01/77		.3
					12/04/78		350.0
					12/01/80		340.0
					1/03/83		220.0
					12/12/83		210.0
					5/14/90		315.0
	Sulphate	MG/L	5.0	250.0	2/01/77		1.5
					12/04/78		3.8
					12/01/80		2.0
					12/12/83		16.0
	Technetium-99	PCI/L	15.0	900.0	2/19/88	<	1.2
					8/04/88	<	4.8
					1/20/89	<	-2.2
	Tetrachloroethylene	PPB	5.0	5.0	5/14/90	<	5.0
	Tetrahydrofuran	PPB	10.0		5/14/90	<	10.0
	Toluene	PPB	5.0	2000.0	5/14/90	<	5.0
	Total dissolved solids	MG/L	5.0	500.0	2/01/77		190.0
					12/04/78		170.0
					1/03/83		140.0
					12/12/83		130.0
	Total potassium	MG/L	.3		12/01/80		7.4
					1/03/83		4.2
					12/12/83		4.2
	Trans-1,2-dichloroethene	PPB	5.0	70.0	5/14/90	<	5.0
	Trichloroethylene	PPB	5.0	5.0	5/14/90	<	5.0
	Tritium	PCI/L	500.0	20000.0	3/21/67		1900.0
					6/15/67		2500.0
					12/04/67		1700.0
					1/05/68		1800.0

Figure 5A-5. Water Quality Data. (sheet 22 of 24)

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Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT	
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date	Analysis Value
6-S31-1P	Tritium	PCI/L	500.0	20000.0	3/26/68	4000.0
					8/05/68	1000.0
					11/04/68	1000.0
					2/05/69	490.0
					5/14/69	540.0
					1/03/75	70.0
					5/01/75	740.0
					7/01/75	480.0
					11/04/75	1100.0
					1/05/76	950.0
					5/03/76	900.0
					6/29/76	910.0
					10/26/76	1100.0
					2/01/77	570.0
					4/25/77	1500.0
					7/28/77	1000.0
					10/31/77	1100.0
					1/11/78	1200.0
					3/21/78	930.0
					6/22/78	470.0
					9/15/78	1200.0
					1/09/79	790.0
					6/12/79	670.0
					9/05/79	640.0
					1/04/80	670.0
					6/09/80	500.0
					9/12/80	1200.0
					1/06/81	480.0
					3/26/81	500.0
					3/22/82	370.0
					6/23/82	540.0
					9/16/82	370.0
					1/03/83	400.0
					3/15/83	-160.0
					6/06/83	-420.0
					8/31/83	-190.0
					12/12/83	-250.0
					4/13/84	72.0
					6/29/84	-190.0
					9/28/84	-250.0
					2/04/85	-150.0
					7/18/85	-430.0
					10/17/85	390.0
					11/26/85	230.0

Figure 5A-5. Water Quality Data. (sheet 23 of 24)

Geosciences Group PARADOX Database

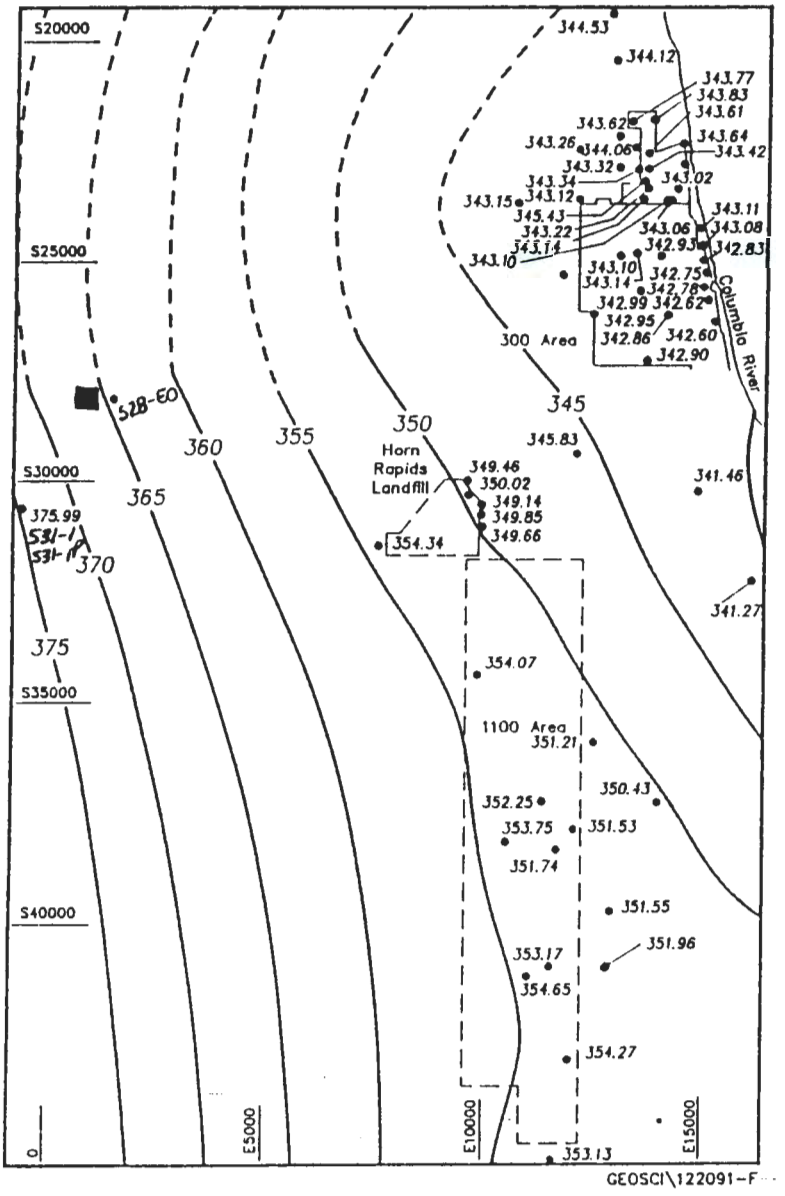
8/05/92

Well Result Report

HPADS Groundwater Data

WELL	CONSTITUENT				RESULT		
Name	Name	Units	Detection Limit	Drinking Water Standard	Sample Date		Analysis Value
6-S31-1P	Tritium	PCI/L	500.0	20000.0	2/24/86	<	380.0
					6/17/86	<	-280.0
					8/13/86		420.0
					11/20/86	<	-130.0
					6/22/87	<	-67.8
					8/24/87	<	-192.0
					10/28/87	<	-53.7
					2/19/88	<	231.0
					8/04/88	<	-87.4
					1/20/89	<	-95.0
	Vinyl chloride	PPB	10.0	2.0	5/14/90	<	10.0
	Xylene-m	PPB	5.0	10000.0	5/14/90	<	5.0
	Xylene-o,p	PPB	5.0	10000.0	5/14/90	<	5.0
	p-Dichlorobenzene	PPB	5.0	750.0	5/14/90	<	5.0
	pH, Field Measurement		.1	8.5	2/01/77		7.9
					12/04/78		8.2
					12/01/80		8.2
					1/03/83		8.2
					12/12/83		8.3
					5/14/90		8.3

Figure 5A-5. Water Quality Data. (sheet 24 of 24)



300/1100 Area Water Table Map December 1991

345.23 • Water table elevation (feet above mean sea level)

300 Water table contours in feet above mean sea level Contour Interval = 5 ft

The 300 Area water table map has been prepared by the Geosciences Group, Environmental Division, of Westinghouse Hanford Company.

Note: To convert to metric, multiply elevation (ft) by 0.3048 to obtain elevation (m).

From: Kasza, et al., 1991

■ HANFORD PATROL ACADEMY

0 1 Mile

0 1 Kilometer

N

Figure 5A-6. Water Table Map.

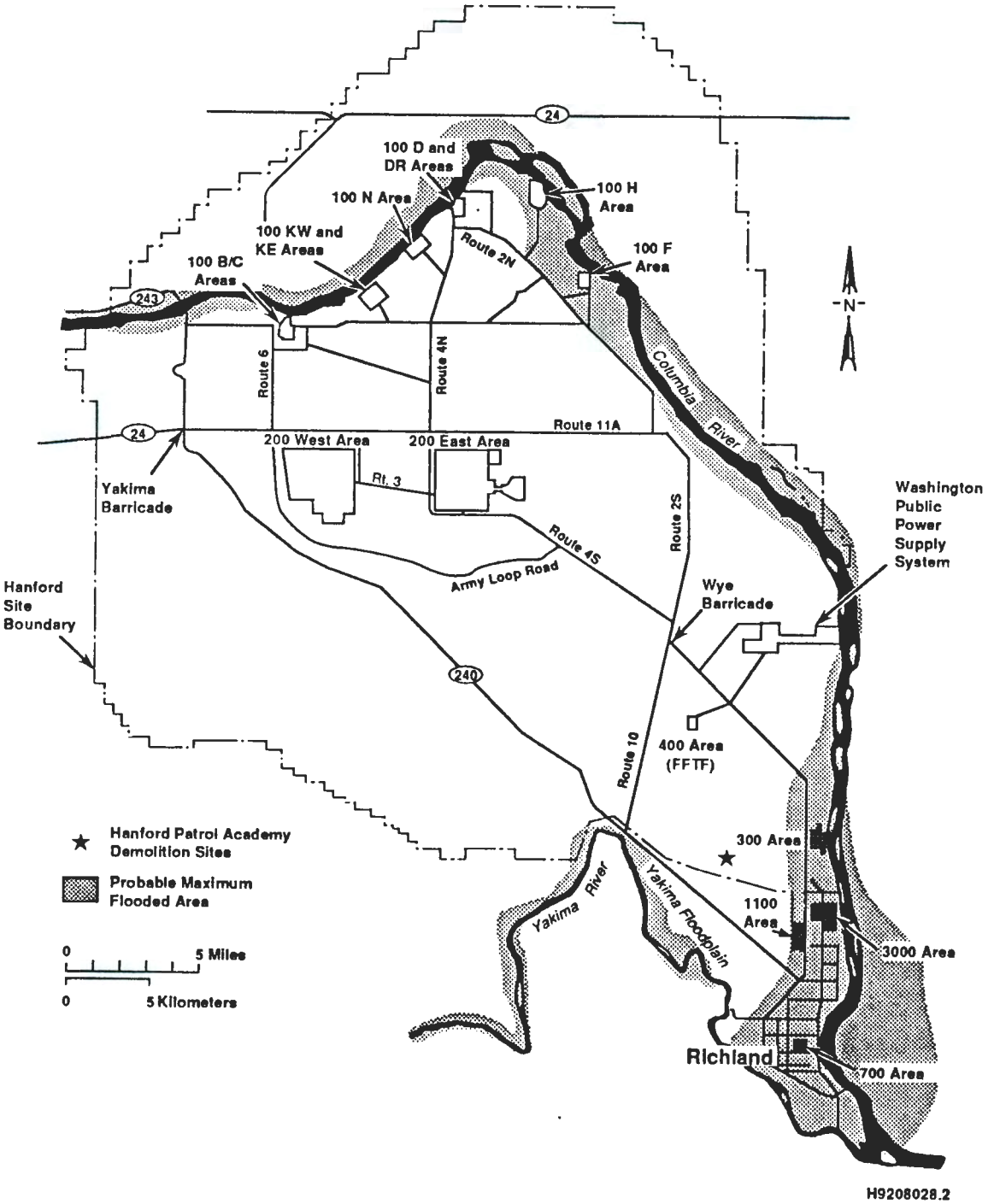


Figure 5A-7. 100-Year Flood Event.

APPENDIX 7A

QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND ANALYSIS FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

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7A.0 QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND ANALYSIS FOR THE HANFORD PATROL ACADEMY DEMOLITION SITES

This appendix provides the quality assurance and quality control information for assuring that the HPADS closure activities (Chapter 7.0) will provide suitable closure data.

7A.1 PROJECT DESCRIPTION

This quality assurance project plan (QAPjP) has been prepared for regulatory review with the HPADS closure plan in support of proposed sampling and analysis activities.

Between August 1983 and October 1991, characteristic ignitable and reactive dangerous waste, consisting predominantly of organic compounds and metal salts, were demolished at the HPADS. This treatment unit will undergo closure consistent with WAC 173-303 regulations. One or more rounds of soil sampling and analysis are proposed in the closure plan (Chapter 7.0) to identify and characterize soil contaminants of concern at the site.

7A.1.1 Project Objectives

The principal objective of investigative sampling will be to determine whether dangerous waste constituents are present in the surface soils at the site at levels of potential regulatory concern. If soil contaminants are discovered at or above levels of concern, then a secondary objective of sampling will be to define the extent of contamination. A minimum of one round of soil sampling is proposed at the HPADS for the overall purpose of characterizing soil contamination. Collected samples will be analyzed in an onsite mobile laboratory.

If any soil is removed from the HPADS to facilitate closure, an intermediate round of sampling and analysis (verification sampling) would be performed to demonstrate that soil removal objectives had been achieved (i.e., that residual contamination levels were below the proposed cleanup values).

If needed, another round of soil sampling and analysis (confirmatory sampling) might be performed to provide confirmation of previous analytical results produced by the onsite mobile laboratory. Confirmatory samples will be split. One set of splits might be analyzed by the onsite mobile laboratory. The second set of splits might be analyzed by an EPA-approved subcontractor laboratory.

7A.1.2 Applicability and Relationship to the Onsite Contractor's Quality Assurance Program

This QAPjP applies specifically to field activities and laboratory analyses to be performed in support of closure of HPADS. This QAPjP has been

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prepared in compliance with the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a). This QAPjP describes the means selected to implement quality assurance program requirements, defined in the *Quality Assurance Manual* (WHC 1988b), as the requirements apply to environmental investigations, while accommodating the specific requirements for project plan format and content agreed upon in the Tri-Party Agreement. The project plan contains a matrix of procedural resources from *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a) and *Environmental Investigations and Site Characterization Manual* (WHC 1988a). This QAPjP is subject to mandatory review and revision in advance of initiation of field sampling activities. Distribution and revision control of this plan will be carried out in compliance with QR 6.0, "Document Control," and QI 6.1, "Quality Assurance Document Control" (WHC 1988b). All plans and procedures referenced in this QAPjP are available for regulatory review.

7A.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

Organization responsibilities are discussed in the following sections.

7A.2.1 Project Management Responsibilities

The operations contractor's Regulatory Support organization and the Environmental Restoration Engineering Function have primary responsibilities for conducting this investigation. An organizational chart is included as Figure 7A-1. The responsibilities of key test personnel and organizations are described in the following.

- **Dangerous Waste Closure Plan Lead (Regulatory Support Organization)**--The Dangerous Waste Closure Plan Lead is responsible for the overall organization of the closure plan and will interface with the regulatory agencies and the U.S. Department of Energy.

- **Technical Lead**--The Technical Lead is responsible for overall direction of sampling and testing activities; responsibilities include the planning and authorization of all work and management of any subcontracted activities, as well as overall technical schedule and budgetary performance.

- **Quality Assurance Officer**--The Quality Assurance Officer is responsible for coordination and/or oversight of performance to the QAPjP requirements by means of internal auditing and surveillance techniques. The Quality Assurance Officer retains the necessary organizational independence and authority to identify conditions adverse to quality and to inform the Technical Lead of needs for corrective action.

- **Health and Safety Officer (Environmental Division/Environmental Field Services)**--The Health and Safety Officer is responsible for determining potential health and safety hazards from volatile and/or

toxic compounds during sample handling and sampling decontamination activities. The Health and Safety Officer has the responsibility and authority to halt field activities because of unacceptable health and safety concerns.

- **Health Physics Technician**--The health physics technician is responsible for ensuring that all monitoring and protection procedures are being followed as required in the dangerous waste operations plan. The health physics technician has the authority to take whatever steps might be necessary to carry out this function.

- **Field Team Leader**--The Field Team Leader is responsible for onsite direction of sampling technicians in compliance with the requirements of the sampling plan (Chapter 7.0, Section 7.2), this QAPjP, and implementing all EIIs.

- **Sample Management Organization**--The sample management organization is responsible for procurement and coordination of analytical support services, sample tracking through the laboratories, and receipt and validation of analytical data as discussed in Section 7A.8.

7A.2.2 Analytical Laboratories

The field sampling team will be responsible for screening all samples for gross alpha and beta/gamma radioactivity and for separating samples for further analysis. Samples with levels exceeding 200 picocuries per gram (total activity) or 60 picocuries per gram (alpha) will be routed to a Hanford Site or participating contractor laboratory qualified to handle analysis of radioactive samples. Samples exceeding 200 picocuries per gram (total activity) or 60 picocuries per gram (alpha) are not expected for this investigation. Samples with lower levels of radioactivity will be routed in accordance with the procedures identified below for chemical samples.

Samples will be routed to an onsite participating contractor, or subcontractor laboratory, who will be responsible for performing the analyses identified in the sampling and analysis plan in Chapter 7.0 and Tables 7A-1 and 7A-2 of this plan, in compliance with work orders or contractual requirements and approved procedures (Section 7A.4.1.2). At the direction of the Technical Lead, services of alternate qualified laboratories may be procured for the performance of split-sample analyses for performance audit purposes. If such an option is selected, the alternate laboratory's quality assurance plan and applicable analytical procedures will be approved before use in compliance with Section 7A.4.1.2 requirements.

7A.2.3 Other Support Contractors

Support contractors could be assigned project responsibilities at the direction of the Technical Lead. Such services will be in compliance with standard Hanford Site procurement procedure requirements as discussed in Section 7A.4.1.2. All work will be performed in compliance with approved

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quality assurance plans and/or procedures, subject to controls of QI 7.3, "Source Surveillance and Inspection" (WHC 1988b).

7A.3 DATA QUALITY OBJECTIVES FOR MEASUREMENTS

Data quality objectives for a given data collection activity describe the overall level of uncertainty that decision makers are prepared to accept in the analytical results deriving from the activity. Data quality requirements generally are defined in terms of specific objectives for precision, accuracy, representativeness, comparability, and completeness. Objectives for soil sampling at HPADS Closure Areas No. 1 and No. 2 are described in this section. Analytes of interest, proposed analytical methods, analytical support levels, and target practical quantitation limit values are listed in Tables 7A-1 and 7A-2.

Precision typically is calculated either as a range (R) (for duplicate measurements) or a standard deviation (σ). Precision also can be expressed as a relative range (RR) (for duplicates) or a relative standard deviation (RSD). When the precision for a method is not constant over the concentration range of interest, the reported range or standard deviation will describe the concentration dependence. The dependence alternatively could be described in terms of a slope and intercept for a linear relationship, an indicated function for a nonlinear relationship, or a tabulated set of precision values for specific indicated concentrations.

Accuracy usually is expressed as percent recovery (P) or as percent bias (P-100). When accuracy is observed to be significantly concentration dependent, it could be reported in terms of a linear relationship, an alternative functional relationship, or as a table of measured values.

The method detection limit is the minimum concentration of a chemical constituent that can be measured reliably (i.e., it can be reported with 99 percent confidence that the analyte concentration is greater than zero). The method detection limit is determined from a minimum of three replicate analyses of samples of a given matrix type (water, soil, etc.) spiked with the analyte of interest. The method detection limit is the standard deviation of the replicate measurements (reported in concentration units) multiplied by the appropriate Student's t value for the number of replicates taken for a one-tailed test at the 99 percent level of confidence. Practical quantitation limit is defined in SW-846 (EPA 1990) as the lowest concentration level that can be determined reliably within specified limits of precision and accuracy during routine laboratory operating conditions. Practical quantitation limit values are tabulated in SW-846 for various EPA approved analytical methods for evaluating solid waste. Practical quantitation limit values are matrix-dependent and method-dependent. Typically, practical quantitation limits are listed as multiples of the method detection limits for specified methods and matrix types.

Requirements are identified in the sampling and analysis plan for collection of split samples and duplicates for the purpose of evaluating the precision of laboratory analyses. In the sampling and analysis plan, specific

quality assurance and quality control requirements are identified for each individual instrument system within the onsite mobile laboratory. These requirements prescribe the types and frequencies of calibration checks to be performed, the minimum frequencies for analyses of splits and duplicates (for evaluation of method precision) and matrix spikes and reference samples (for evaluation of method accuracy). Accuracy and precision will be calculated and reported as described previously.

The performance of the analytical laboratory shall be subject to method- and analyte-specific quantitation limits as identified in Tables 7A-1 and 7A-2 and minimum requirements for precision, accuracy, and completeness as follows:

- Precision: The range (R), or difference, for individual pairs of duplicates shall be within (i.e., less than) the critical range (R_c) value. The critical range is determined from the historical average value of the range ($\bar{R}$) as follows (ASTM 1983):

  $$R_c = 3.27\ \bar{R}$$

  (When this technique is employed to evaluate precision, R_c must be recomputed periodically to reflect the most current value of $\bar{R}$.)

- Accuracy: Percent recoveries (P) for individual determinations of spikes and standards must fall within 2 standard deviations (95 percent confidence interval) of the average percent recovery ($\bar{P}$) (ASTM 1983).

- Completeness: Requirements for precision and accuracy will be met for at least 80 percent of the total number of determinations on quality assurance and quality control samples.

More stringent requirements for precision and accuracy could be specified in procedures for individual laboratory methods. In that event, the more stringent requirements also will apply as data quality objectives for this project.

Goals for data representativeness for soil sampling are addressed qualitatively by the specification of sample locations and intervals in the soil sampling and analysis plan. Sample data should be comparable with other measurement data for similar samples and sample conditions. Comparability will be achieved qualitatively by using standard techniques to collect and analyze representative samples and by reporting analytical results in appropriate units.

Approved analytical procedures will require adherence to reporting techniques and units that are consistent with EPA reference methods to facilitate the comparability of data sets in terms of precision and accuracy. Actual achieved and/or used detection limits, and values for precision, accuracy, and completeness will be provided in all summary reports of analyses.

Failure to conform to these criteria will be documented in data summary reports as described in Section 7A.8.1, and will be evaluated in the validation process discussed in Section 7A.8.2. Corrective actions will be initiated by the Technical Lead as appropriate, as noted in Section 7A.13, in the event that the criteria initially are not achieved.

For any soil sampling activities that are to occur at the HPADS subsequent to investigative sampling, Tables 7A-1 and 7A-2 will be updated to reflect current analytes of interest and data quality objectives as project requirements. The listed practical quantitation limit values in Tables 7A-1 and 7A-2 will be used as target values in negotiations for procurement of analytical laboratory services in support of these activities.

7A.4 PROCEDURES

The following sections discuss sampling procedures to be used and the approvals and control of these procedures.

7A.4.1 Procedure Approvals and Controls

The following sections describe the procedures referenced to support soil sampling and analysis activities.

7A.4.1.1 Hanford Site Procedures. The Hanford Site procedures that have been referenced to support soil sampling and analysis activities for HPADS Closure Areas No. 1 and No. 2 are listed in the quality assurance program index in the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a). Referenced procedures include EIIs (WHC 1988a), and quality requirements (QRs) and quality instructions (QIs) (WHC 1988b). Requirements relating to approval, revision, and distribution control of EIIs are addressed in EII 1.2, "Preparation and Revision of Environmental Investigation Instructions"; requirements applicable to QIs and QRs are addressed in QR 5.0, "Instructions, Procedures, and Drawings"; QI 5.1, "Preparation of Quality Assurance Documents:; QR 6.0, "Document Control"; and QI 6.1, "Quality Assurance Document Control". Other controlling documents that apply to preparation, review, and revision of Hanford Site analytical laboratory procedures and sample management procedures are identified under Criteria 5.00 and 6.00 in the *Environmental Engineering, Geotechnology, and Permitting Function Quality Assurance Program Plan* (WHC 1990a). All of the aforementioned procedures will be available on request for regulatory review.

7A.4.1.2 Participating Contractor and/or Subcontractor Procedures. As noted in Section 7A.2.1, participating contractor and/or subcontractor services may be procured at the direction of the Technical Lead. All such procurements will be subject to the applicable requirements of QR 4.0, "Procurement Document Control"; QI 4.1, "Procurement Document Control"; QI 4.2, "External Services Control"; QR 7.0, "Control of Purchased Items and Services"; QI 7.1, "Preprocurement Planning and Proposal Evaluation"; and/or QI 7.2, "Supplier Evaluation" (WHC 1988b). Whenever such services require procedural controls, conformance to onsite procedures, or submittal of contractor procedures for

onsite review and approval before implementation, the requirement(s) will be identified in the procurement document or work order, as applicable. Analytical laboratories will be required to submit their analytical procedures as well as the current version of their internal quality assurance program plans for review and approval. The subject plans and procedures will be reviewed and approved by operations contractor's quality assurance, sample management, and analytical laboratories organization personnel, and/or other qualified personnel as determined by the Technical Lead. As necessary, all reviewers will be qualified per the requirements of EII 1.7, "Indoctrination, Training, and Qualification" (WHC 1988a). All approved participating contractor or subcontractor procedures, plans, and/or manuals will be retained as project quality records in compliance with the *Document Control and Records Management Manual*, Section 9 (WHC 1989a); QR 17.0, "Quality Assurance Records"; and QI 17.1, "Quality Assurance Records Control" (WHC 1988b). All such documents will be available on request for regulatory review.

7A.4.2 Sampling Procedures

Soil samples for analysis in the onsite mobile laboratory and for confirmatory analysis by an offsite contractor laboratory will be collected in compliance with EII 5.2, "Soil and Sediment Sampling" (WHC 1988a). Sample numbers will be assigned as indicated in EII 5.10, "Obtaining Sample Identification Numbers and Accessing HEIS Data" (WHC 1988a). Sampling activities will be carried out in conformance with the sample identification, container type, preparation, and preservation requirements of EII 5.11, "Sample Packaging and Shipping" (WHC 1988a).

Field screening analyses for chemical constituents will be performed in accordance with EII 5.9, "Soil Gas Sampling" (WHC 1988a). Additional appendices to EII 5.9 (in preparation) will address operation, maintenance, and calibration procedures for various individual field portable instruments.

7A.4.3 Procedure Additions and Changes

Additional EIIs or modifications to existing EIIs that might be required as a consequence of sampling plan requirements will be developed in compliance with EII 1.2, "Preparation and Revision of Environmental Investigations Instructions" (WHC 1988a). Should deviations from established EIIs be required to accommodate unforeseen field situations, the Field Team Leader can authorize such deviations consistent with provisions and requirements in EII 1.4, "Deviation from Environmental Investigations Instructions" (WHC 1988a). Deviations are documented, reviewed, and dispositioned by means of instruction change authorization forms, as required by EII 1.4. Other types of document change requests will be completed as required by the procedures governing their preparation and revision.

7A.5 SAMPLE CUSTODY

All samples obtained during the course of this investigation will be controlled from the point of origin to the analytical laboratory as stipulated in EII 5.1, "Chain of Custody" (WHC 1988a). Chain-of-custody documentation also will be maintained for the return of residual sample materials from the laboratory. Requirements and procedures will be defined in procurement documentation to subcontractor or participant contractor laboratories for the return of residual sample materials after completion of analysis. Laboratory chain-of-custody procedures will ensure that sample integrity and identification are maintained throughout the analytical process and will be reviewed and approved in advance as required by onsite procurement control procedures, as noted in Section 7A.4.1.2.

Results of analyses will be traceable to the original samples through a unique code or identifier, as specified in Section 7A.4. All analytical results will be controlled as permanent project quality records as required by QR 17.0, "Quality Assurance Records" (WHC 1988b) and EII 1.6, "Records Management" (WHC 1988a).

Sample and/or data flow will be coordinated by the sample management organization (Figure 7A-1). The sample management organization will be responsible for tracking, controlling, and verification of in-process samples and data per Section 1.0, "Sample Tracking"; Section 1.3, "Data Package Control", and Section 1.1, "Data Package Verification" (WHC 1990b).

All soil samples will be screened in the field for beta/gamma and gross alpha radioactivity in compliance with approved Hanford Site health physics procedures (WHC 1988c). Samples must be released for offsite shipment by health physics technicians before the samples can be transported to offsite laboratories for analysis of dangerous constituents.

7A.6 CALIBRATION PROCEDURES

Calibration of all measuring and test equipment, whether in existing inventory or purchased for this investigation will be controlled as required by QR 12.0, "Control of Measuring and Test Equipment"; QI 12.1, "Acquisition and Calibration of Portable Measuring and Test Equipment"; QI 12.2, "Measuring and Test Equipment Calibration by User" (WHC 1988b); and/or applicable EIIs (WHC 1988a). Routine operational checks for field equipment will be as defined within applicable EIIs or other field procedures. Similar information will be provided in operations contractor-approved participating contractor or subcontractor procedures.

Calibration of Hanford Site, participating contractor, and/or subcontractor laboratory analytical equipment will be performed per applicable standard methods, subject to review and approval.

7A.7 ANALYTICAL PROCEDURES

Specific analytical methods or procedures will be reviewed and approved before use in compliance with the procedures and procurement control requirements noted in Section 7A.4.1 of this QAPjP.

7A.8 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation of completed laboratory data packages, reporting requirements, and review and records management are discussed in the following sections.

7A.8.1 Data Reduction and Data Package Preparation

On completion of each group of analyses, the analytical laboratory will be responsible for preparing a report summarizing the analytical results. The analytical laboratory also will prepare a detailed data package that will include all information necessary to perform data validation to the extent indicated by the minimum applicable requirements of Section 7A.8.2. Data summary report format and data package content will be defined in procurement documentation subject to review and approval as noted in Section 7A.4.1. As a minimum, laboratory data packages will include the following:

- Sample receipt and tracking documentation (including identification of the organization and individuals performing the analysis, the names and signatures of the responsible analysts, sample holding time requirements, references to applicable chain-of-custody procedures, and the dates of sample receipt, extraction, and analysis)

- Instrument calibration documentation, including equipment type and model, with continuing calibration data for the time period in which the analyses were performed

- Quality control data, as appropriate for the methods used, including matrix-spike/matrix-spike duplicate data, recovery percentages, precision data, laboratory blank data, and identification of any nonconformances that might have affected the laboratory's measurement system during the time in which the analyses were performed

- The analytical results or data deliverables, including reduced data, reduction formulas or algorithms, and identification of data outliers and/or deficiencies.

Other supporting information, such as initial calibration data, reconstructed ion chromatographs, spectrograms, traffic reports, and raw data, need not be included in submittal of individual data packages unless specifically requested by the Technical Lead or the sample management office. All sample data, however, will be retained by the analytical laboratory and made available for systems or program audit purposes upon the request of the operations contractor, DOE-RL, or regulatory agency representatives

(Section 7A.10.0). Such data will be retained by the analytical laboratory through the duration of the contractual statement of work, at which time the data will be transmitted for archiving.

A completed data package will be reviewed and approved by the analytical laboratory quality assurance manager before the package is submitted to the sample management organization for validation.

The requirements of this section will be included in procurement documents and/or work orders, as appropriate, in compliance with the procurement control procedures identified in Section 7A.4.1.

7A.8.2 Validation

Validation of completed laboratory data packages will be performed by the sample management organization. Data validation and reporting will be performed in conformance with requirements and procedures identified in *Data Validation Procedures for Chemical Analyses* (WHC 1992).

In the case of data obtained by field screening methods, the results will not be submitted in the form of data packages or sample delivery groups, and data reduction and reporting will not be subject to validation.

Data validators will perform a number of tasks on each sample delivery group in response to general and specific requirements identified in the data validation procedures (WHC 1992). A sample delivery group is defined as a group of samples (usually 20 or fewer) reported within a single laboratory data package. These tasks are summarized as follows:

- Take delivery of the data package, stamp the receipt date on the package, and make duplicate copies of the sample concentration reports or report forms

- Organize and review the data package for completeness as described in the data validation procedures Section 3.0 through Section 9.0 (WHC 1992) and document the completeness review on the applicable data validation checklist

- Validate the data package and qualify sample results according to the procedures and criteria described in the data validation procedures Section 3.0 through Section 10.0 (WHC 1992). Data that are rejected at any point during validation will be eliminated from further review or consideration

- Check for calculation and transcription errors, applying the frequency guidelines identified below

- Resolve any discrepancies identified during the review of the data package, including any missing data, with the laboratory

- After the data have been validated, prepare a narrative summary of the acceptability of the data, and prepare a summary of the validated results in tabular and electronic formats

- Submit the data validation report, with the narrative summary, an electronic media copy of the data, checklists, summary forms, and the qualified laboratory concentration reports to the Technical Lead within 21 days after receipt of the data package from the laboratory.

For this sampling and analysis project, the following frequencies will be used to check for calculation and transcription errors.

- **Investigative samples and verification samples taken following soil removal**--All reported laboratory results for at least 20 percent of the samples contained in the sample delivery group and 100 percent of the reported quality control samples (duplicates, matrix spikes, field blanks and any performance audit samples) will be recalculated and verified against the instrument printouts and bench sheet records (raw data). If possible, at least one-half of the samples selected for recalculation should contain positive results for the compounds analyzed.

- **Confirmatory samples**--All reported laboratory results for 100 percent of the samples contained in the sample delivery group and 100 percent of the reported quality control samples (duplicates, matrix spikes, field blanks and any performance audit samples) will be calculated and verified against the raw data.

Reporting requirements for validation of data produced by routine and special analytical methods other than EPA reference methods (EPA 1990) will be established within applicable procedures for the individual methods, subject to review and approval as discussed in Section 7A.4.1. The reporting requirements will be in general compliance with the guidelines provided previously in this section.

7A.8.3 Final Review and Records Management Considerations

All validation reports and supporting analytical data packages will be subjected to a final technical review by a qualified reviewer at the direction of the Technical Lead before submittal to regulatory agencies or inclusion in reports or technical memoranda. All validation reports, data packages, and review comments will be retained as permanent project quality records in compliance with *Document Control and Records Management Manual*, Section 9 (WHC 1989a) and QR 17.0, "Quality Assurance Records" (WHC 1988b).

7A.9 INTERNAL QUALITY CONTROL

All analytical samples will be subject to in-process quality control measures both in the field and in the laboratory. The following types of

control samples are specified in the sampling and analysis plan for the purpose of maintaining internal quality control.

- Duplicate Samples--Field duplicate samples are samples retrieved from a single sampling location using the same equipment and sampling technique, but analyzed independently. Laboratory duplicate samples are samples taken successively from the same bulb. Duplicate samples generally are used to verify the repeatability or reproducibility of the analytical data.

- Split Samples--Field or field duplicate samples can be split in the field and sent to an alternative laboratory as a performance audit of the primary laboratory.

- Trip Blanks--A trip blank for soil sampling consists of a sample container of pure silica sand that is prepared in the laboratory, transported to the sampling site, and returned unopened for analysis with the actual soil samples. Analysis of the trip blank will eliminate false positive results for the actual samples arising from contamination during shipment.

- Field Blanks--A field blank for soil sampling consists of pure silica sand placed in a container identical to those used for the actual samples. The field blank is transported to the site, opened at the site, and submitted with the samples for analysis. A field blank is used to eliminate false positives arising from contamination of samples from the atmosphere at the sampling site in addition to the uses cited for trip blanks.

- Equipment Blanks--An equipment blank for soil sampling consists of pure silica sand that is drawn through decontaminated sampling equipment and placed in a container identical to those used for the actual field samples. Equipment blanks are used to verify the adequacy decontamination procedures for sampling equipment in addition to the uses cited for field blanks.

Additional quality control checks will be performed by the analytical laboratories as follows.

- Matrix-Spiked and Matrix-Spiked Duplicate Samples--A known quantity of a representative analyte of interest is added to an aliquot (or a replicate) of an actual sample as a measure of recovery percentage. Spike compound selection, quantities, and concentrations will be described in the laboratory's analytical procedures.

- Quality Control Reference Samples--A quality control reference sample is prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range. Reference samples provide an independent check on analytical technique and methodology.

The numbers and/or frequencies of quality control samples to be submitted and analyzed with each group of soil samples are specified in the soil sampling and analysis plan presented in Section 7.0 of the closure plan. The numbers of quality control samples proposed in the sampling plan have been determined based on guidance presented in SW-846 (EPA 1990).

Other requirements specific to calibration of laboratory analytical equipment are included in Section 6.0 of this plan. Detailed descriptions of internal quality control requirements for participating contractor or subcontractor laboratories will be provided in procurement documents or work orders in compliance with standard procedures noted in Section 7A.4.1.

7A.10 PERFORMANCE AND SYSTEM AUDITS

Performance, system, and program audits will begin early in the execution of this sampling plan and continue through completion of activities. Collectively, the audits will address quality affecting activities that include, but are not limited to, measurement accuracy; intramural and extramural analytical laboratory services; field activities; and data collection, processing, validation, and management.

Performance audits of the analytical accuracy of field screening instrumentation will be facilitated by performing internal quality control checks (i.e., testing reference and calibration standards) at regular intervals specified by procedure.

Internal quality control checks also will be performed to evaluate the analytical accuracy of the onsite mobile laboratory. In addition, the onsite mobile laboratory will be enrolled in and periodically evaluated by the Proficiency Environmental Testing program, administered by the Analytical Products Group, a subsidiary of Curtin Matheson Scientific, Inc. The Proficiency Environmental Testing program distributes standards (i.e., spiked samples) bimonthly to participating laboratories for analysis. Standards are provided for gas chromatograph analyses for volatile and semivolatile organics, x-ray fluorescence metals, and ions analyzed by ion chromatography. The Analytical Products Group collates and evaluates the results reported by the various laboratories. Subsequently, the quality assurance officer for each laboratory will receive a report of findings, including the true values of constituents in the standards, the individual laboratory's percent recovery, the means and standard deviations for all participating laboratories, and the individual laboratory's deviation from the mean for each standard. Participation in the Proficiency Environmental Testing program will be the primary performance audit tool for the onsite mobile screening laboratory operation.

Regarding offsite contractor laboratory analyses of confirmatory soil samples, performance audits of analytical accuracy will be implemented through the use of quality assurance and quality control samples. Confirmatory soil samples will be split in the field. The offsite contractor laboratory will receive one group of splits; the second group will be

analyzed in the onsite mobile laboratory. Field and equipment blanks will be included in both groups.

System audit requirements will be implemented in accordance with QI 10.4, "Surveillance" (WHC 1988b). Surveillances will be performed regularly throughout the course of sampling activities. Additional performance and system 'surveillances' might be scheduled as a consequence of corrective action requirements or might be performed on request. All quality affecting activities will be subject to surveillance.

Sampling plan activities could be evaluated as part of environmental restoration program-wide quality assurance audits under procedural requirements (WHC 1988b). Program audits will be conducted in accordance with QR 18.0, "Audits"; QI 18.1, "Audit Programming and Scheduling"; and QI 18.2, "Planning, Performing, Reporting, and Follow-up of Quality Audits". Program audits will be performed by qualified auditors in compliance with QI 2.5, "Qualification of Quality Assurance Program Audit Personnel" (WHC 1988b).

7A.11 PREVENTIVE MAINTENANCE

All measurement and testing equipment used in the field and the laboratory that directly affect the quality of analytical data will be subject to preventive maintenance measures that ensure minimization of measurement system downtime. Preventive maintenance instructions for field equipment will be as stipulated in approved operating procedures for the equipment. Laboratories will be responsible for performing or managing the maintenance of assigned analytical equipment. Maintenance requirements, spare parts lists, and preventive maintenance instructions will be included in individual laboratory procedures or in laboratory quality assurance plans, subject to review and approval. When samples are to be analyzed by a contractor or subcontractor laboratory, preventive maintenance requirements for laboratory analytical equipment will be as defined in the contractor laboratory's quality assurance plan(s).

7A.12 DATA ASSESSMENT

Analytical data will be compiled and summarized by the laboratory and forwarded to the sample management organization for validation as described in Section 7A.8.2 before the data can be used in any assessment activities. Assessments could include various statistical and probabilistic techniques to compare and/or analyze data. The statistical methodologies and assumptions that are to be used to evaluate data will be identified in written instructions that are to be signed, dated, and retained as project quality records in compliance with EII 1.6, "Records Management" (WHC 1988a) and QR 17.0, "Quality Assurance Records" (WHC 1988b). These instructions will be documented in the final report for each sampling and analysis project.

7A.13 CORRECTIVE ACTION

Corrective actions required as a result of surveillance reports, nonconformance reports, or audit activities will be documented and dispositioned as required by QR 16.0, "Corrective Action"; QI 16.1, "Trending/Trend Analysis"; and QI 16.2, "Corrective Action Reporting" (WHC 1988b). Primary responsibilities for corrective action resolution will be assigned to the Technical Lead and the quality assurance coordinator. Other needs for corrections to measurement systems, procedures, or plans that are identified as a result of routine review processes will be resolved as stipulated in applicable procedures or referred to the Technical Lead for resolution. Copies of all surveillance, nonconformance, audit, and corrective action documentation will be retained as project quality assurance records.

7A.14 QUALITY ASSURANCE REPORTS

As indicated in Sections 7A.10 and 7A.13, project activities will be assessed regularly by audit and surveillance processes. At the conclusion of a given sampling and analysis project, all related field and laboratory data, raw data, reports, surveillance reports, nonconformance reports, audit reports, and corrective action documentation will be transferred for archival to the Hanford Site Records Holding Area (if documentation has not been transmitted previously). In the event that original quality-affecting documents are to be retained and/or controlled by others, legible copies will be transmitted to the Records Holding Area for inclusion in the project record file.

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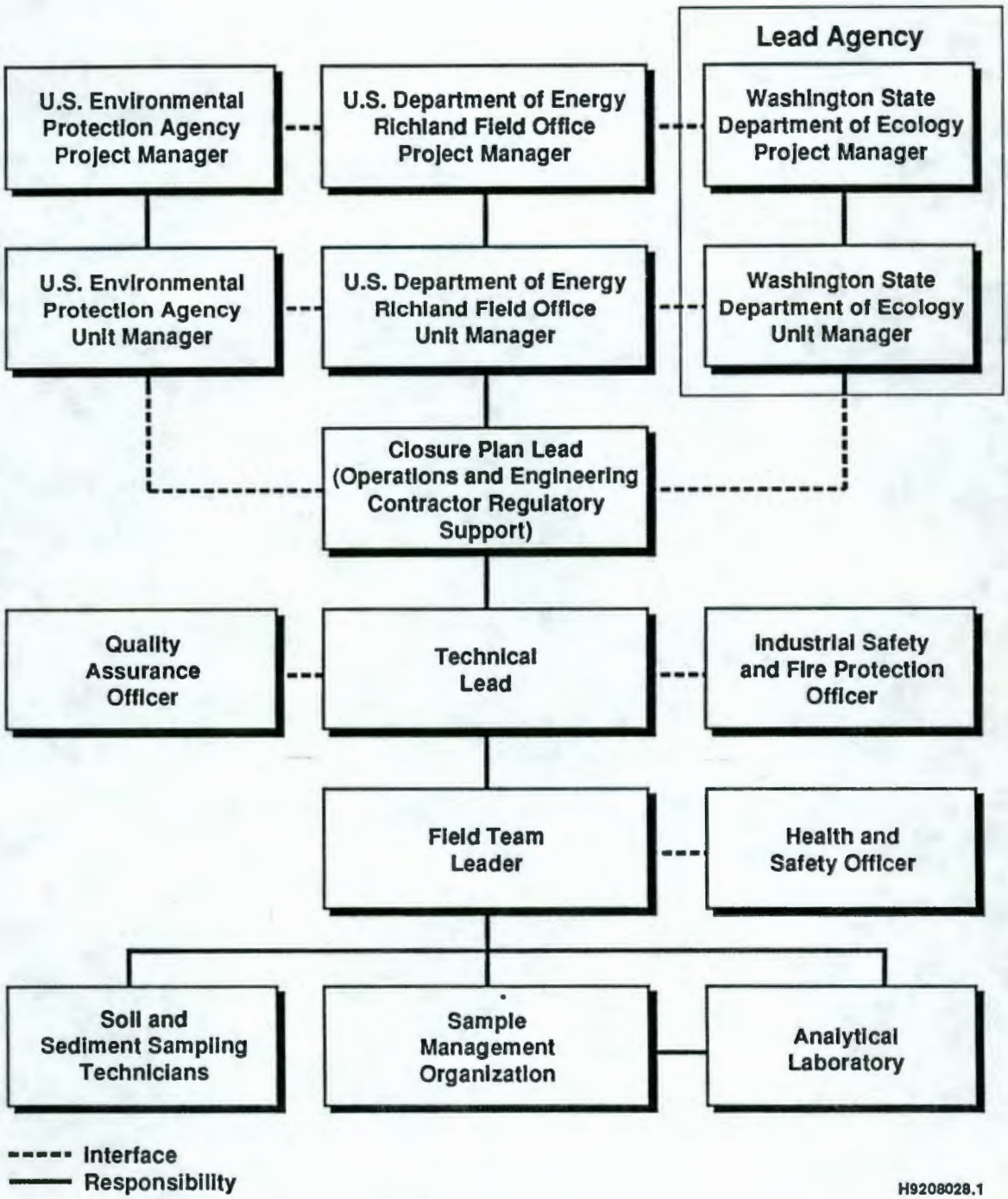

Figure 7A-1. Project Organization for Sampling and Analysis for Hanford Patrol Academy Demolition Sites Closure Areas No. 1 and No. 2.

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Table 7A-1. Hanford Patrol Academy Demolition Sites Closure Area No. 1 Analytical Methods, Analytical Support Levels, and Target Practical Quantification Limit Values for Investigative Soil Sampling.

Analysis for volatile organics by purge and trap followed by GC/MS (Analytical Level III):

- TIC analytes (PQL = 100 μg/kg):
  - 2-Butoxyethanol
  - Ethyl ether
  - Tetrahydrofuran

Auxiliary analyses (Analytical Level II, PQL N/A):

- Soil pH

GC/MS = gas chromatograph/mass spectrometer.
PQL = practical quantification limit.
μg/kg = microgram per kilogram.
N/A = not applicable.

Table 7A-2. Hanford Patrol Academy Demolition Sites Closure Area No. 2 Analytical Methods, Analytical Support Levels, and Target Practical Quantification Limit Values for Investigative Soil Sampling.

Analysis for volatile organics by purge and trap followed by GC/MS (Analytical Level III):

- TCL analytes (PQL = 5 µg/kg):
  - Benzene
  - Carbon disulfide
- TIC analytes (PQL = 100 µg/kg, except as noted):
  - Allyl ether
  - 2-Butoxyethanol
  - Butyl ethanol (aka 2-Hexanol)
  - n-Butyl ether
  - 1,4-Diethoxybutane
  - Dimethoxypropane
  - Dioxane (poor purging analyte, PQL = 1,000 µg/kg)
  - Di-tert butyl ether
  - 2-Ethoxybutanone
  - 2-Ethoxyethanol
  - Ethylene glycol dimethyl ether
  - Ethyl ether
  - Isopropyl ether
  - 2-Methoxyethyl ether
  - 2-Methylfuran
  - Tetrahydrofuran

Analysis for semivolatile organics by SFE followed by GC/MS (Analytical Level III):

- TCL analytes (PQL = 10 µg/kg):
  - Benzoic acid (degradation product of benzoyl peroxide)
  - 2,4-Dinitrophenol
- TIC analytes (PQL = 3,300 µg/kg):
  - 2,4-Dinitroresorcinol
  - Dipicrylamine
  - 2,2',4,4',6,6'-Hexanitrodiphenylamine
  - Naphthacene
  - alpha-Nitrosomethylisobutyl ketone
  - Picryl chloride
  - 1,3,5-Trinitrobenzene
  - 2,4,6-Trinitroresorcinol
  - 2,4,6-Trinitrotoluene

Aqueous extraction followed by direct aqueous injection (Analytical Level III, PQL = 100 mg/kg):

- n-Butanol (degradation product of butyllithium)
- Unknown glycol compound [Dibutyl tetraethylene glycol (sic)]
- Isopropyl alcohol
- Methanol
- Picric acid

Aqueous extraction followed by ion chromatography (Analytical Level III, PQL = 100 mg/L):

- Chloride

Ancillary analyses (Analytical Level II, PQL N/A):

- Soil pH

GC/MS = gas chromatograph/mass spectrometer.
TCL = target compound list.
TIC = tentatively identified compound.
PQL = practical quantification limit.
µg/kg = microgram per kilogram.
mg/kg = milligram per kilogram.
mg/L = milligram per liter.
SFE = supercritical fluid extraction.
N/A = not applicable.

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APPENDIX 7B

TRAINING COURSE DESCRIPTIONS

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APPENDIX 7B

This appendix contains a training matrix and brief course descriptions.

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Environmental and Hazardous Material Safety Training Matrix.

Employee category	Course title (length/frequency)														
	Hazardous Communication and Waste Orientation (1 hour)	Generator Hazards Safety Training (4 hours)	Hazardous Materials Waste Job-Specific Training (length varies with each TSD unit)	Radiation Worker Training (8 hours)	Waste Site Basic (16 hours)	Scott SKA-PAK* Training (2 hours)	Cardiopulmonary Resuscitation (4 hours)	Fire Extinguisher Safety (1 hour)	Waste Site Advanced (24 hours)	Waste Site Field Experience (24 hours)	Hazardous Waste Shipment Certification (24 hours)	Certification of Hazardous Material Shipments (8 hours)	Hazardous Waste Site Supervisor/Manager (8 hours)	Compliance Category**	Total hours
1. All employees	X														1
2. General worker		X	X											1	5 + unit-specific training
3. General supervisor/manager		X	X											1	5 + unit-specific training
4. General nonradiological shipper		X	X								X			1,2	29 + unit-specific training
5. General hazardous material shipper		X	X									X		1,2	13 + unit-specific training
6a. Hazardous waste worker (known hazards)		X	X	X	X									1,3	28 + unit-specific training + field experience
6b. Hazardous waste worker (unknown hazards)		X	X	X		X	X	X	X	X				1,4	44 + unit-specific training + field experience
7. Hazardous waste supervisor/manager		X	X	X		X	X	X	X	X			X	1,5	52 + unit-specific training + field experience
8. Hazardous waste shipper		X	X	X		X	X	X	X	X	X	X		1,2,4	76 + unit-specific training + field experience

* Scott SKA-PAK is a trademark of Figgie International, Incorporated.
** Compliance categories:
1 WAC 173-303, 29 CFR 1910.1200
2 49 CFR 173
3 29 CFR 1910.120 (24-hour requirement)
4 29 CFR 1910.120 (40-hour requirement)
5 29 CFR 1910.120 (40-hour plus 8-hour requirement).

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ENVIRONMENTAL AND HAZARDOUS MATERIAL SAFETY TRAINING		
	Course name	Description
1.	Hazard Communication and Waste Orientation	Course provides an overview of the federal and applicable hazard communication programs and hazardous and/or dangerous waste disposal programs.
2.	Generator Hazards Safety Training	Course provides the hazardous and/or dangerous material/waste worker with the fundamentals for use and disposal of hazardous and/or dangerous materials.
3.	Hazardous Materials/Waste Job-Specific Training	Course provides specific information on hazardous and/or dangerous chemicals and waste management at the employees' TSD unit.
4.	Initial Radiation Worker Training	Course provides radiation workers with the fundamentals of radiation protection and the proper procedures for maintaining exposures ALARA.
5.	Waste Site Basics	Course provides required information for the safe operation of hazardous and/or dangerous waste TSD units regulated under 40 CFR 264 and 265 pursuant to RCRA and WAC 173-303.
6.	Scott 'SKA-PAK'[1] Training-SKA	Course instructs employees in the proper use of the Scott 'SKA-PAK' for entry, exit, or work in conditions 'immediately dangerous to life and health' and instructs employees to recognize and handle emergencies.
7.	Cardiopulmonary Resuscitation	Course of the American Heart Association that provides certification in cardiopulmonary resuscitation for the single rescuer (Heartsaver Course).

[1]Scott SKA-PAK is a trademark of Figgie International, Incorporated.

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	Course name	Description
8.	Fire Extinguisher Safety	Course provides videocassette presentation that covers types of portable fire extinguishers and the proper usage for each.
9.	Waste Site-Advanced	Course provides environmental safety information for RCRA and/or CERCLA operations and sites. Topics include regulations and acronyms, occupational health and safety, chemical hazard information, toxicology, personal protective equipment and respirators, site safety, decontamination, and chemical monitoring instrumentation.
10.	Waste Site Field Experience	Course is a 3-day field experience under the direct supervision of a trained, experienced supervisor.
11.	Hazardous Waste Shipment Certification	Course provides an indepth look at federal, state, and Hanford Site requirements for nonradioactive hazardous and/or dangerous waste management and transportation.
12.	Certification of Hazardous Material Shipments	Course provides training in dangerous material regulation of the U.S. Department of Transportation, as required by law, to those who certify the compliance of Hanford Site hazardous and/or dangerous material shipments. The main focus is on the proper preparation and release of radioactive material shipments.
13.	Hazardous Waste Site Supervisor/Manager	Course provides specialized training to operations and site management in the following programs: safety and health, employee training, personal protective equipment, spill containment, and health hazard monitoring procedures and techniques.

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