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Revision 0
UC-630, 721

200 West Ash Pit Demolition Site Closure Plan

Date Published
November 1992

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



Approved for Public Release

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STATE ENVIRONMENTAL POLICY ACT
ENVIRONMENTAL CHECKLIST FORMS

FOR
THE 200 WEST ASH PIT DEMOLITION SITE
CLOSURE PLAN

REVISION 0

November 1992

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

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A. BACKGROUND

1. Name of proposed project, if applicable:

Closure of the 200 West Ash Pit Demolition Site (Ash Pit Demolition Site).

Within this checklist, "Ash Pit Demolition Site" refers to the 200 West Ash Pit Demolition Site, and "ash pit" refers to the entire, disturbed borrow and ash pit.

2. Name of applicants:

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

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

U.S. Department of Energy	Westinghouse Hanford Company
Richland Field Office	P.O. Box 1970
P.O. Box 550	Richland, Washington 99352
Richland, Washington 99352	

Contact Persons:

J. D. Bauer, Acting Program Manager	R. E. Lerch, Deputy Director
Office of Environmental Assurance,	Restoration and Remediation
Permits, and Policy	(509) 376-5556
(509) 376-5441	

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 Ash Pit Demolition Site would begin and would be completed within 180 days after approval of the closure plan following notification by the Washington State Department of Ecology (Ecology).

- 1 7. Do you have any plans for future additions, expansion, or further
2 activity related to or connected with this proposal? If yes, explain.
3

4 There are no plans for future additions, expansions, or use of the Ash
5 Pit Demolition Site. However, the entire ash pit is scheduled to be
6 addressed as part of a *Comprehensive Environmental Response, Compensation
7 and Liability Act (CERCLA) of 1980* operable unit at a later date.
8

- 9 8. List any environmental information you know about that has been prepared,
10 or will be prepared, directly related to this proposal.
11

12 This *State Environmental Policy Act (SEPA) of 1971* Environmental
13 Checklist is being submitted to Ecology concurrently with the *200 West
14 Ash Pit Demolition Site* closure plan.
15

16 General Hanford Site information is found in the *Hanford Site National
17 Environmental Policy Act (NEPA) Characterization* document, PNL-6415,
18 Revision 4, Pacific Northwest Laboratory, 1991, Richland, Washington.
19

20 In accordance with the *Hanford Federal Facility Agreement and Consent
21 Order (Tri-Party Agreement)*, additional information concerning the
22 200 West Ash Pit is located in the Waste Information Data System.
23

- 24 9. Do you know whether applications are pending for government approvals of
25 other proposals directly affecting the property covered by your proposal?
26 If yes, explain.
27

28 No applications to government agencies are known to be pending.
29

- 30 10. List any government approvals or permits that will be needed for your
31 proposal, if known.
32

33 In accordance with the Tri-Party Agreement, Ecology is the lead
34 regulatory agency that will approve the Ash Pit Demolition Site closure
35 plan pursuant to the requirements of Washington Administrative Code,
36 (WAC) 173-303-610 and 40 Code of Federal Regulations (CFR) Parts 265.381
37 and 270.1. A *National Environmental Policy Act (NEPA) of 1969* review
38 will be required before closure can proceed.
39

- 40 11. Give brief, complete description of your proposal, including the proposed
41 uses and the size of the project and site. There are several questions
42 later in this checklist that ask you to describe certain aspects of your
43 proposal. You do not need to repeat those answers on this page.
44

45 The proposed action is the clean closure of the Ash Pit Demolition Site.
46 The Ash Pit Demolition Site consists of a square parcel of land
47 approximately 20 feet (6 meters) by 20 feet (6 meters), which is situated
48 within a multi-use borrow pit area, the ash pit, roughly 600 feet
49 (183 meters) by 800 feet (244 meters) in size. The Ash Pit Demolition
50 Site was used to detonate shock-sensitive and reactive laboratory
51 chemicals that were determined to be either excess or beyond their
52 designated stock life. Two detonation events occurred in November of
53 1984 and June of 1986.

1 The discarded chemicals were placed in shallow depressions to control the
2 detonation process. Explosives were placed around the chemicals and
3 detonated using electric blasting caps and primer cord.
4

5 Because of the location of the ash pit within the 200 West Area, the
6 closure investigation began with a radiation survey of the demolition
7 site. The results of the radiation survey confirmed that there is no
8 radiation above background levels at the Ash Pit Demolition Site. Any
9 radiation encountered would have been from 200 West Area activities not
10 associated with the Ash Pit Demolition Site. Soil samples would be taken
11 to determine if there is any contamination and the resulting action
12 levels would be determined. Action levels are contaminant concentrations
13 that would require a cleanup response and would be negotiated with
14 Ecology. If it is found that all contamination present is from the Ash
15 Pit Demolition Site activities alone and is above action levels, the soil
16 would be treated and/or disposed of in a permitted landfill and the
17 demolition site closed as a RCRA site. If it is found that all
18 contamination is from other nearby sources, the Ash Pit Demolition Site
19 would be closed as a RCRA site and remediated under CERCLA as part of
20 200-SS-2 operable unit, which contains the ash pit. If, however, the
21 soil is contaminated from other sources in addition to the Ash Pit
22 Demolition Site activities, the soil would be remediated in coordination
23 with CERCLA as part of the 200-SS-2 operable unit. All equipment used in
24 performing closure activities would be decontaminated or disposed of at a
25 permitted facility.
26

27 Postclosure care would be required only if the treatment unit cannot
28 attain clean closure. If the underlying soils or the groundwater are
29 contaminated, the site will not be considered closed until the
30 remediation under CERCLA is complete.
31

- 32 12. Location of the proposal. Give sufficient information for a person to
33 understand the precise location of your proposed project, including a
34 street address, if any, and section, township, and range, if known. If a
35 proposal would occur over a range of area, provide the range or
36 boundaries of the site(s). Provide a legal description, site plan,
37 vicinity map, and topographic map, if reasonably available. While you
38 should submit any plans required by the agency, you are not required to
39 duplicate maps or detailed plans submitted with any permit applications
40 related to this checklist.
41

42 The ash pit site is located on the eastern boundary of the 200 West Area.
43 The demolition site is located within the ash pit. The location within
44 the 200 West Area is approximately 1,500 feet (457 meters) northeast of
45 the U Plant and approximately 1,000 feet (305 meters) southwest of the
46 main entrance to the 200 West Area (20th Street). The 200 West Area is
47 located roughly in the center of the Hanford Site, Section 6,
48 Township 12 N, Range 26 E.
49

B. ENVIRONMENTAL ELEMENTS

1. Earth

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

Flat terrain.

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

The steepest slope in the 200 West Area is less than 10 percent.

- 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.

The main soil types found in the area are sand and loess. Some of the sand present is in the form of shallow sand dunes.

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

The presence of sand dunes in the area indicate some instability of the soils in the vicinity, but the floor of the ash pit has been disturbed in such a manner as to stabilize the soil.

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

No fill will be required by this closure.

- 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.

1 2. Air

- 2
3 a. What types of emissions to the air would result from the proposal
4 (i.e., dust, automobile, odors, industrial wood smoke) during
5 construction and when the project is completed? If any, generally
6 describe and give approximate quantities, if known.
7

8 There could be minor dust and vehicle exhaust from closure
9 activities. No volatile organic carbon emissions are expected
10 because the detonation events were designed to eliminate most of the
11 chemicals and the events occurred in 1984 and 1986.
12

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

15 No.
16

- 17
18 c. Proposed measures to reduce or control emissions or other impacts to
19 the air, if any?

20 None.
21

22
23 3. Water

- 24 a. Surface

- 25
26
27 1) Is there any surface water body on or in the immediate vicinity
28 of the site (including year-round and seasonal streams,
29 saltwater, lakes, ponds, wetlands)? If yes, describe type and
30 provide names. If appropriate, state what stream or river it
31 flows into.
32

33 No.
34

- 35
36 2) Will the project require any work over, in, or adjacent to
37 (within 200 feet) the described waters? If yes, please describe
38 and attach available plans.
39

40 No.
41

- 42 3) Estimate the amount of fill and dredge material that would be
43 placed in or removed from surface water or wetlands and indicate
44 the area of the site that would be affected. Indicate the source
45 of fill material.
46

47 None.
48

- 49 4) Will the proposal require surface water withdrawals or
50 diversions? Give general description, purpose, and approximate
51 quantities if known.
52

53 No.

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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 at the site. Because of the low rainfall and the warm climate, this water will return 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.

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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
- grass
- pasture
- crop or grain
- wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
- water plants: water lily, eelgrass, milfoil, other
- other types of vegetation

Forbes and grasses might be seasonally present.

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

The 200 West Ash Pit is a disturbed site and contains only small quantities of grasses and/or forbes.

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

There are no known threatened or endangered species found to exist in or near the demolition site.

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

Because the entire ash pit might still be used for occasional ash disposal, and is scheduled to be remediated under future CERCLA activities, no revegetation or landscaping would occur under this closure plan.

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:.....

While there are many species of animals found on the Hanford Site, none of these exclusively use the demolition site area. Additional information on the Hanford Site animals can be found in the environmental document referred to in the answer to Checklist Question A.8.

- 1 b. List any threatened or endangered species known to be on or near the
2 site.
3

4 The demolition site is not known to be used by any threatened or
5 endangered species. Additional information regarding endangered
6 species on the Hanford Site can be found in the environmental
7 document referred to in the answer to Checklist Question A.8.
8

- 9 c. Is the site part of a migration route? If so, explain.
10

11 While the Hanford Site and the adjacent Columbia River are part of
12 the broad Pacific Flyway for waterfowl migration, the ash pit site
13 itself is not used in such a manner.
14

- 15 d. Proposed measures to preserve or enhance wildlife, if any:
16

17 None.
18

19 6. Energy and Natural Resources
20

- 21 a. What kinds of energy (electric, natural gas, oil, wood stove, solar)
22 will be used to meet the completed project's energy needs? Describe
23 whether it will be used for heating, manufacturing, etc.
24

25 None.
26

- 27 b. Would your project affect the potential use of solar energy by
28 adjacent properties? If so, generally describe.
29

30 No.
31

- 32 c. What kinds of energy conservation features are included in the plans
33 of this proposal? List other proposed measures to reduce or control
34 energy impacts, if any:
35

36 None.
37

38 7. Environmental Health
39

- 40 a. Are there any environmental health hazards, including exposure to
41 toxic chemicals, risk of fire and explosion, spill, or hazardous
42 waste, that could occur as a result of this proposal? If so,
43 describe.
44

45 It is believed that the waste inventory that was treated, which
46 consisted of discarded explosive, ignitable, and/or reactive,
47 nonradioactive chemical compounds, was totally consumed during the
48 various thermal detonation events. It also is believed that any
49 remaining residues should have been decomposed by the natural
50 processes of oxidation and hydration. It is also possible that some
51 dangerous residues might have remained on the site along with small
52 shards of glass or metal remnants from the containers that were
53 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 sampling will determine if there are any remaining residues that might pose a threat to human health or the environment. If there are, the contaminated soil will be removed and disposed of in permitted disposal sites. Removal would be carried out in accordance with approved procedures for removal of dangerous waste by trained waste workers.

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 Ash Pit Demolition Site is currently part of the larger ash pit. This larger ash pit was used and might still be used for a variety of activities such as tumbleweed incineration and ash disposal. These other uses of the ash pit do not impact the proposed activities for the demolition site.

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

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

c. Describe any structures on the site.

None.

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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 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.

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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.

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

3
4 No.

5
6 c. Proposed measures to reduce or control impacts on recreation,
7 including recreation opportunities to be provided by the project or
8 applicant, if any?

9
10 None.

11
12 **13. Historic and Cultural Preservation**

13
14 a. Are there any places or objects listed on, or proposed for, national,
15 state, or local preservation registers known to be on or next to the
16 site? If so, generally describe.

17
18 No places or objects listed on, or proposed for, national, state, or
19 local preservation registers are known to be on or next to the site.
20 Additional information regarding the cultural resources on the
21 Hanford Site environment can be found in the environmental documents
22 referred to in the answer to Checklist Question A.8.

23
24 b. Generally describe any landmarks or evidence of historic,
25 archaeological, scientific, or cultural importance known to be on or
26 next to the site.

27
28 There are no known archaeological, historical, or Native American
29 religious sites on or next to the unit. Additional information
30 regarding this can be found in the environmental documents referenced
31 in the answer to Checklist Question A.8.

32
33 c. Proposed measures to reduce or control impacts, if any:

34
35 None.

36
37 **14. Transportation**

38
39 a. Identify public streets and highways serving the site, and describe
40 proposed access to the existing street system. Show on site plans,
41 if any.

42
43 Does not apply.

44
45 b. Is site currently served by public transit? If not, what is the
46 approximate distance to the nearest transit stop?

47
48 The unit is a controlled location and public transportation is not
49 allowed to the site.
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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).

No.

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
J. 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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200 WEST ASH PIT DEMOLITION SITE
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 identification 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 200 West Ash Pit Demolition Site, 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 *200 West Ash Pit Demolition Site 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 three appendices.

This *200 West Ash Pit Demolition Site Closure Plan* submittal contains information current as of October 15, 1992.

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1 environmental investigations at the Hanford Site, performance audit
2 requirements are fulfilled by periodic submittal of blind samples to the
3 primary laboratory or the analysis of split samples by an independent
4 laboratory. System audit requirements are implemented through the use of
5 standard surveillance procedures.

6
7 **Comparability**--For the purposes of sampling activities, comparability is an
8 expression of the relative confidence with which one data set might be
9 compared with another.

10
11 **Completeness**--For the purposes of sampling activities, completeness is a
12 quantitative parameter expressing the percentage of measurements judged to be
13 valid.

14
15 **Deviation**--For the purpose of sampling activities, deviation refers to a
16 planned departure from established criteria that might be required as a result
17 of unforeseen field situations or that might be required to correct
18 ambiguities in procedures that may arise in practical applications.

19
20 **Facility/facility**--Dependent on context, the term 'facility', as used in this
21 closure plan, could refer to the following.

22
23 The Hanford Facility is a single *Resource Conservation and Recovery Act*
24 (RCRA) of 1976 facility, identified by the EPA/State Identification Number
25 WA7890008967, that consists of over 60 treatment, storage, and/or disposal
26 (TSD) units included in the *Hanford Facility Dangerous Waste Part A Permit*
27 *Application* (DOE-RL 1988b). The Hanford Facility consists of the contiguous
28 portion of the Hanford Site that contains these TSD units and, for the
29 purposes of RCRA, is owned and operated by the U.S. Department of Energy
30 (excluding lands north and east of the Columbia River, river islands, lands
31 owned by the Bonneville Power Administration, lands leased to the Washington
32 Public Power Supply System, and lands owned by or leased to the state of
33 Washington).

34
35 A facility as defined in WAC 173-303-040, i.e., building nomenclature
36 commonly used at the Hanford Facility. In this context, the term 'facility'
37 remains as part of the title for various TSD units (e.g., 2727-S Storage
38 Facility, Hexone Storage and Treatment Facility).

39
40 **Nonconformance**--A nonconformance is a deficiency in characteristic,
41 documentation, or procedure that renders the quality of material, equipment,
42 services, or activities unacceptable or indeterminate. When the deficiency is
43 of a minor nature, does not effect a permanent or significant change in
44 quality if it is not corrected, and can be brought into conformance with
45 immediate corrective action, the deficiency shall not be categorized as a
46 nonconformance. However, if the nature of the condition is such that it
47 cannot be immediately and satisfactorily corrected, it shall be documented in
48 compliance with approved procedures and brought to the attention of management
49 for disposition and appropriate corrective action.

50
51 **Precision**--Precision is a measure of the repeatability or reproducibility of
52 specific measurements under a given set of conditions. Specifically,

1 precision is a quantitative measure of the variability of a group of
2 measurements compared to their average value. Precision normally is expressed
3 in terms of standard deviation, but also could be expressed as the coefficient
4 of variation (i.e., relative standard deviation) and range (i.e., maximum
5 value minus minimum value). Precision is assessed by means of duplicate
6 and/or replicate sample analysis.

7
8 **Quality assurance**--For the purposes of sampling activities, quality assurance
9 refers to the total integrated quality planning, quality control, quality
10 assessment, and corrective action activities that collectively ensure that the
11 data from monitoring and analysis meet all end user requirements and/or the
12 intended end use of the data.

13
14 **Quality assurance project plan**--The quality assurance project plan is an
15 orderly assembly of management policies, project objectives, methods, and
16 procedures that defines how data of known quality will be produced for a
17 particular project or investigation.

18
19 **Quality control**--For the purposes of sampling activities, quality control
20 refers to the routine application of procedures and defined methods to the
21 performance of sampling, measurement, and analytical processes.

22
23 **Replicate sample**--Replicate samples are two aliquots removed from the same
24 sample container in the laboratory and analyzed independently.

25
26 **Representativeness**--For the purposes of sampling activities,
27 representativeness is the degree to which data accurately and precisely
28 represent a characteristic of a population parameter, variations at a sampling
29 point, or an environmental condition. Representativeness is a qualitative
30 parameter that is most concerned with the proper design of a sampling program.

31
32 **Site-wide background**--The natural background established for the Hanford Site.
33 Includes all contributions from anthropogenetic sources unrelated to Hanford
34 Site operations.

35
36 **Validation**--For the purposes of sampling activities, validation refers to a
37 systematic process of reviewing a body of data against a set of criteria to
38 provide assurance that the data are acceptable for their intended use.

39
40 **Verification**--For the purposes of sampling activities, verification refers to
41 the process of determining whether procedures, processes, data, or
42 documentation conform to specified requirements. Verification activities
43 might include inspections, audits, surveillances, or technical review.

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PART A

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4 The Part A, Form 1, included in this closure plan was submitted to the
5 Washington State Department of Ecology in May 1988. The Part A, Form 1,
6 consists of three pages.
7

8 The original Part A, Form 3, Revision 0, was submitted to the Washington
9 State Department of Ecology in November 1985. Revision 1 of the Part A,
10 Form 3, was prepared to provide more extensive unit, process, and dangerous
11 waste descriptions, and to remove dangerous waste code D001. Also, one
12 drawing was revised and one drawing and one photograph were removed.
13 Revision 2 of the Part A, Form 3, was prepared to include Westinghouse Hanford
14 Company as co-operator of the Ash Pit Demolition Site. Revision 3 of the
15 Part A, Form 3, was prepared to correct process design capacities, to provide
16 more detailed process and dangerous waste descriptions, and to add dangerous
17 waste codes D001, D002, WT01, and WT02. Also, the site drawing was revised
18 and a new photograph was provided.
19

20 The Part A, Form 3 (Revision 3), included in this closure plan consists
21 of seven 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)

L. EPA/STATE LD. NUMBER

WA17891010181967

III. NAME OF FACILITY
U.S. DEPARTMENT OF ENERGY-HANFORD SITE

III. FACILITY CONTACT
A. NAME & TITLE (incl. Dept. & Div.)
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
005

IV. SIC CODES (4-digit, in order of priority)
A. FIRST
9711 NATIONAL SECURITY
B. SECOND
8922 NUCLEAR NONCOMMERCIAL DEVELOPMENT AND EDUCATION
C. THIRD
9611 ADMINISTRATION AND GENERAL ECONOMICS PROGRAM
D. FOURTH
4911 STEAM-ELECTRIC GENERATION

VII. OPERATOR INFORMATION
A. NAME (DOE-RL)
DEPARTMENT OF ENERGY-RICHLAND OPERATIONS
WESTINGHOUSE HANFORD COMPANY (WHC)
B. Is the name listed in Item VI-A also the owner?
 YES NO
C. STATUS OF OPERATOR (Enter the appropriate letter or letters in the operator block if "Other", specify.)
F = FEDERAL M = PUBLIC (other than federal or state) S = STATE O = OTHER (specify)
F
D. PHONE (area code & no.)
509 376 7395
E. STREET OR P.O. BOX
PO BOX 550 / PO BOX 1970
F. CITY OR TOWN
RICHLAND
G. STATE
WA
H. ZIP CODE
99352
VII. INDIAN LAND
Is the 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

93127 21162

93127 21163

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 this 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 & OFFICE TITLE (Print or type)	B. SIGNATURE	C. DATE
SEE ATTACHMENT		

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

5-19-88
Date

W. M. Jacob
William M. Jacob
President
Westinghouse Hanford Company
Co-operator

5/13/88
Date

9312721164

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

RM 3	DANGEROUS WASTE PERMIT APPLICATION	1. EPA/STATE I.D. NUMBER
		WA 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY		
APPLICATION APPROVED	DATE RECEIVED <i>(mo., day, & yr.)</i>	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.
08		84

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	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			Treatment:		
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS	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
Disposal:					
INJECTION WELL	D80	GALLONS OR LITERS			
LANDFILL	D81	ACRE-FEET <i>(the volume that would cover one acre to a depth of one foot)</i> 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			

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

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. PRO-CESS CODE <i>(from list above)</i>		B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY	LINE NUMBER	A. PRO-CESS CODE <i>(from list above)</i>		B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY
	1.	2.	1. AMOUNT <i>(specify)</i>	2. UNIT OF MEASURE <i>(enter code)</i>			1.	2. UNIT OF MEASURE <i>(enter code)</i>			
X-1	S	02	600	G		5					
X-2	T	03	20	E		6					
1	T	04	150	U		7					
						8					
						9					
3						10					
4											

Continued from the front.

PROCESSES (continued)

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

T04

The 200 West Area Ash Pit Demolition Site (Ash Pit Demolition Site) is located in the 200 West Area of the Hanford Facility. The Ash Pit Demolition Site was used to detonate explosive waste that was generated on the Hanford Site. The process design capacity for treatment at the Ash Pit Demolition Site was 150 gallons (569 liters) 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)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
	K 0 5 4	900	P	T 0 3 D 8 0	
	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2			T 0 3 D 8 0	included with above

Continued from page 2.

E: Photocopy this page before completing if you have more than 26 wastes to list.

NUMBER (entered from page 1)

A 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)			
1	D 0 0 1	1,000	K	T04			Treatment-Other (Demolition)
2	D 0 0 2						
3	D 0 0 3						
4	D 0 0 7						
5	D 0 1 8						
6	P 0 0 3						
7	U 0 1 9						
8	U 0 5 6						
9	U 0 9 8						
10	U 1 0 8						
11	U 1 1 2						
12	U 1 1 7						
13	U 1 3 3						
14	U 1 3 5						
15	U 1 5 4						
16	U 2 1 3						
17	U 2 2 0						
18	W C 0 1						
19	W P 0 1						
20	W T 0 1						
21	W T 0 2	↓	↓	↓			Included with above.
22							
23							
24							
25							
26							

Continued from the front.

DESCRIPTION OF DANGEROUS WASTES (continued)

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

The Ash Pit Demolition Site was used for the treatment of shock-sensitive or potentially explosive chemical waste. This waste 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 dangerous waste (WT02) and carcinogenic extremely hazardous waste (WC01). The estimated annual quantity of waste of 1,000 kilograms (2204 pounds) represents the total amount of waste that is believed to have been treated at the Ash Pit Demolition Site.

21168

SCALE 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

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

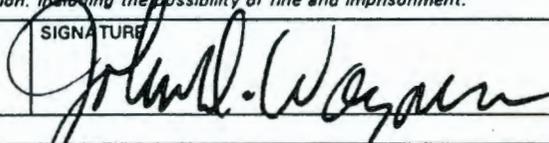
IX. OWNER CERTIFICATION

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)

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

SIGNATURE



DATE SIGNED

11/19/92

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.

NAME (print or type)

SEE ATTACHMENT

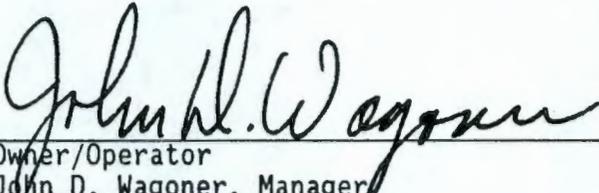
SIGNATURE

DATE SIGNED

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.

93127021169



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

11/18/92
Date

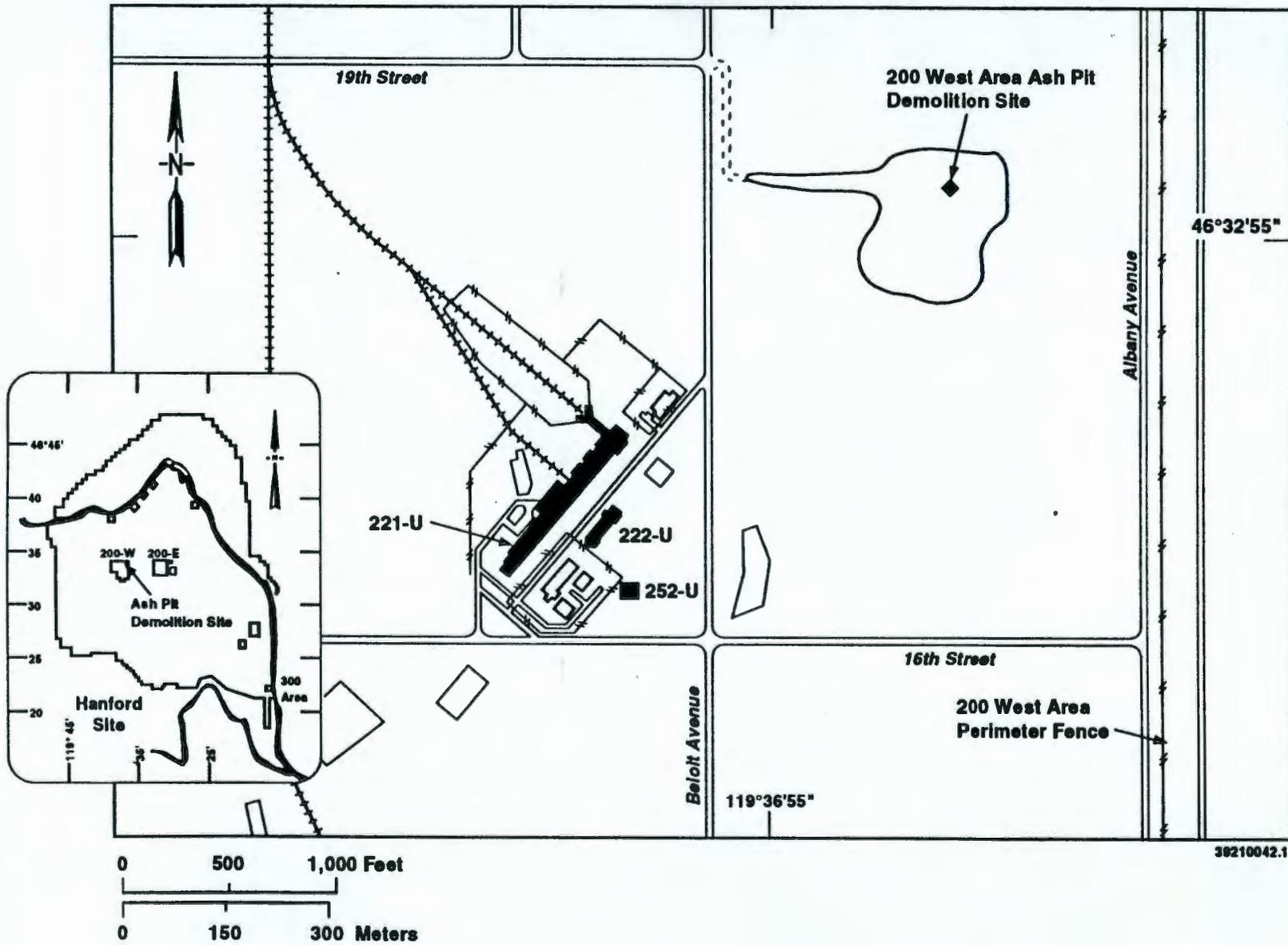


Co-Operator
Thomas M. Anderson, President
Westinghouse Hanford Company

10-30-92
Date

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200 West Area Ash Pit Demolition Site Site Plan



200 West Area Ash Pit Demolition Site



9 3 1 2 7 2 1 1 7 1

46°33'10.37"
119°36'44.58"

92070921-7w
(PHOTO TAKEN 1992)

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1.0 INTRODUCTION

This chapter provides background information for the 200 West Ash Pit Demolition Site (Ash Pit Demolition Site) and provides an overview of the contents of the Ash Pit Demolition Site closure plan.

1.1 BACKGROUND

The Ash Pit Demolition Site was the site of two known demolition events, one that occurred in November of 1984, and the second that occurred in June of 1986. These demolition events were a form of thermal treatment for spent or abandoned chemical waste. Because the Ash Pit Demolition Site will no longer be used for this thermal activity, the site 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.

This closure plan presents a description of the Ash Pit Demolition Site, the history of the waste treated, and the approach that will be followed to close the Ash Pit Demolition Site. 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 Ash Pit Demolition Site operations will be addressed in this closure plan in accordance with WAC 173-303-610(2)(b)(i).

The Ash Pit Demolition Site is located within the 200-SS-2 (source) and 200-UP-1 (groundwater) operable units as designated in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1990). The soil and groundwater of these operable units, 200-SS-2 and 200-UP-1, will be addressed through the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) of 1980 remedial investigation/feasibility study process. Therefore, any required remedial action, with respect to contaminants not associated with the Ash Pit Demolition Site, will be deferred to the CERCLA remedial investigation/feasibility study process. Characterization work on the 200-SS-2 operable unit is not expected to begin until sometime after fiscal year 1992. A work plan for the 200-UP-1 groundwater operable unit will begin in fiscal year 1993.

1.2 ASH PIT DEMOLITION SITE CLOSURE PLAN CONTENTS

The Ash Pit Demolition Site closure plan consists of the following nine chapters.

- Introduction (Chapter 1.0)
- Facility Description (Chapter 2.0)
- Process Information (Chapter 3.0)

- 1 • Waste Characteristics (Chapter 4.0)
- 2 • Groundwater Monitoring (Chapter 5.0)
- 3 • Closure Performance Standards (Chapter 6.0)
- 4 • Closure Activities (Chapter 7.0)
- 5 • Postclosure Plan (Chapter 8.0)
- 6 • References (Chapter 9.0).

7
8 A brief description of each chapter is provided in the following
9 sections.

10
11
12 **1.2.1 Facility Description (Chapter 2.0)**

13
14 This chapter provides a brief description of the Hanford Site and the
15 location and description of the Ash Pit Demolition Site. Information on
16 Hanford Site security also is provided.

17
18
19 **1.2.2 Process Information (Chapter 3.0)**

20
21 This chapter describes how the Ash Pit Demolition Site processed the
22 waste and explains the overall waste treatment system.

23
24
25 **1.2.3 Waste Characteristics (Chapter 4.0)**

26
27 This chapter discusses the waste inventory and the characteristics of the
28 waste that was treated at the Ash Pit Demolition Site.

29
30
31 **1.2.4 Groundwater Monitoring (Chapter 5.0)**

32
33 This chapter discusses the probability that groundwater contamination has
34 not occurred and that groundwater monitoring is not needed.

35
36
37 **1.2.5 Closure Performance Standards (Chapter 6.0)**

38
39 This chapter discusses the closure strategy, performance standards for
40 protection of health and the environment, and closure activities.

41
42
43 **1.2.6 Closure Activities (Chapter 7.0)**

44
45 This chapter discusses sampling and analysis activities for closure. A
46 closure schedule and a certification are included.

47
48
49 **1.2.7 Postclosure Plan (Chapter 8.0)**

50
51 This chapter outlines provisions for postclosure care if required.
52

1 1.2.8 References (Chapter 9.0)

2
3 References used throughout this closure plan are listed in this chapter.
4 All references listed here, which are not available from other sources, will
5 be made available for review, upon request, to any regulatory agency or public
6 commentor. References can be obtained by contacting the following:

7
8 Administrative Records Specialist
9 Public Access Room H4-22
10 Westinghouse Hanford Company
11 P.O. Box 1970
12 Richland, Washington 99352

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2.0 FACILITY DESCRIPTION 2-1

2.1 GENERAL HANFORD SITE DESCRIPTION 2-1

2.2 HANFORD FACILITY DESCRIPTION 2-1

2.3 DESCRIPTION OF 200 WEST ASH PIT DEMOLITION SITE 2-2

2.4 SECURITY INFORMATION 2-2

FIGURES

2-1. Hanford Site F2-1

2-2. 200 West Area F2-2

2-3. Ash Pit Demolition Site Layout F2-3

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2.0 FACILITY DESCRIPTION

This chapter briefly describes the Hanford Site, the Hanford Facility, and the location of the Ash Pit Demolition Site, 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 1988). 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).

1 **2.3 DESCRIPTION OF 200 WEST ASH PIT DEMOLITION SITE**
2

3 The Ash Pit Demolition Site is located in the eastern portion of the
4 200 West controlled-access area (Figure 2-2). Figure 2-3 details the layout
5 of the Ash Pit Demolition Site.
6

7 The Ash Pit Demolition Site is situated in a multi-use borrow pit area.
8 The entire borrow pit area is approximately 600 feet (183 meters) by 800 feet
9 (244 meters). The floor of the borrow pit was graded sometime before the
10 demolition activities conducted in 1984. Portions of the borrow pit have been
11 used for a variety of other activities, including burning of tumbleweeds and
12 soil excavation for construction material. The Ash Pit Demolition Site
13 activities occupied only a small portion [an area 20 feet (6 meters) by
14 20 feet (6 meters)] of the large borrow pit, and was located away from the
15 other activities.
16

17 The known detonation events occurred November 1984 and June 1986. The
18 chemicals generally were placed in a shallow depression, 6 inches
19 (15 centimeters) to 12 inches (30 centimeters) deep, dug expressly for the
20 demolition activity. The depression was still evident at the time of
21 demarcation. The site was staked and roped off in 1988. The demolition area
22 has warning signs designating the area as a dangerous waste site. The area
23 roped off is approximately 20 feet (6 meters) by 20 feet (6 meters) square.
24 Surveyed monuments have been placed around the Ash Pit Demolition Site.
25

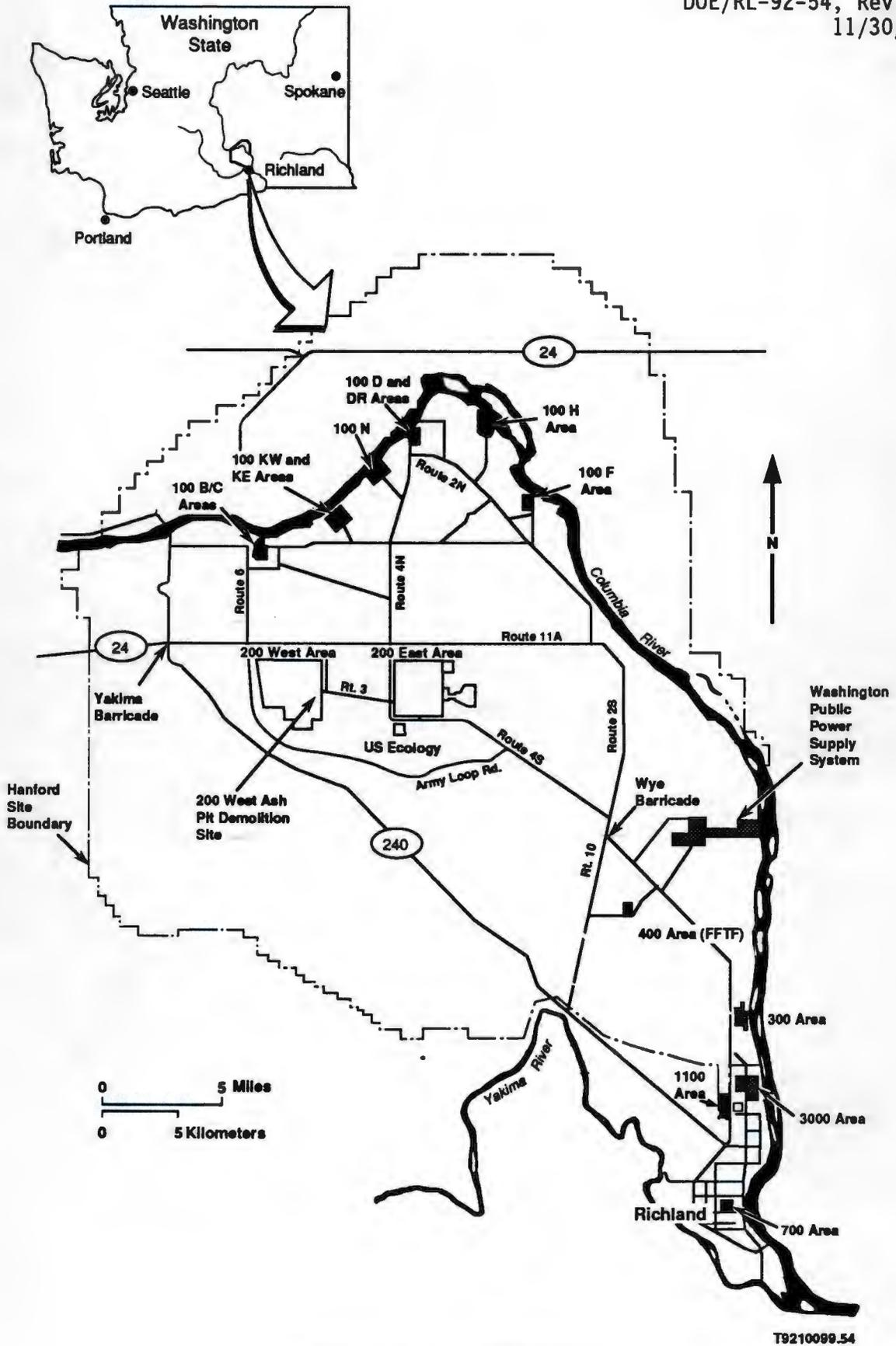
26
27 **2.4 SECURITY INFORMATION**
28

29 The entire Hanford Site is a controlled-access area. Access control to
30 operational areas of the Hanford Site is expected to remain for the
31 foreseeable future [while active institutional control is likely to continue
32 indefinitely, for purposes of conservatism, a 100-year active institutional
33 control period was assumed with passive controls after that time (DOE 1987)].
34 The Hanford Site maintains around-the-clock surveillance for the protection of
35 government property, classified information, and special nuclear materials.
36 The Hanford Patrol maintains a continuous presence of armed guards to provide
37 Hanford Site security.
38

39 Manned barricades are maintained around the clock at checkpoints on
40 vehicular access roads leading to the operational areas of the Hanford Site.
41 All personnel accessing these areas must have a U.S. Department of Energy-
42 issued security identification badge indicating the appropriate authorization.
43 Personnel also might be subject to a search of items carried into or out of
44 these areas.
45

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Figure 2-1. Hanford Site.

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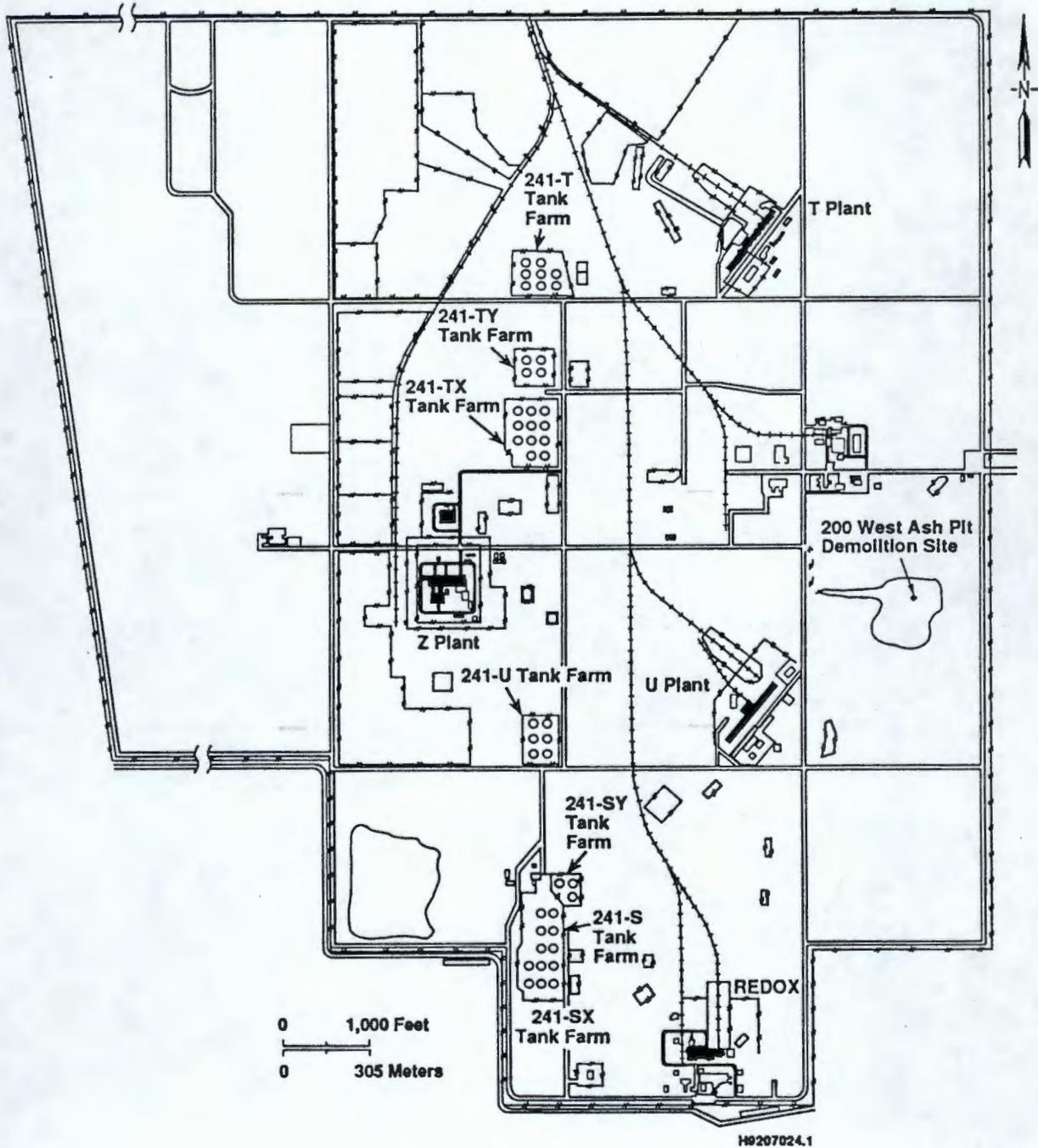


Figure 2-2. 200 West Area.

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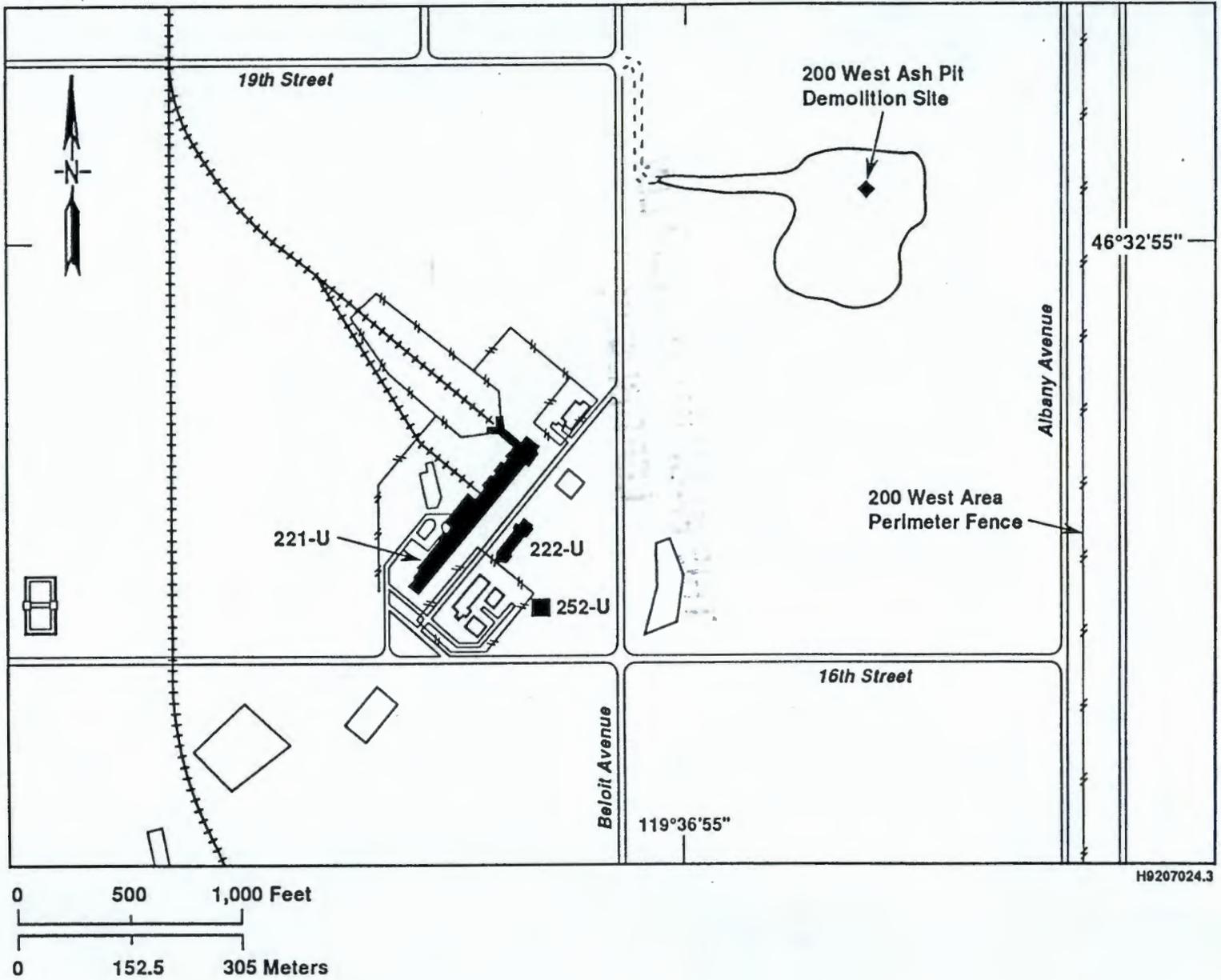


Figure 2-3. Ash Pit Demolition Site Layout.

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3.0 PROCESS INFORMATION 3-1

APPENDIX

3A PHOTOGRAPHS APP 3A-i

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3.0 PROCESS INFORMATION

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4 The Ash Pit Demolition Site activities were limited to two demolition
5 events in 1984 and 1986. Photographs of the Ash Pit Demolition Site are
6 included in Appendix 3A.
7

8 The chemicals detonated at the Ash Pit Demolition Site generally were
9 shock-sensitive or reactive laboratory chemicals that were determined to be
10 either in excess or beyond designated stock life. The detonation activities
11 were limited to two events, one in November of 1984 and one in June of 1986.
12 The two detonation events were performed at the same location. The
13 detonations were performed during off-work hours under the observation of the
14 Hanford Patrol, the Richland Police Department Bomb Squad, and the Hanford
15 Fire Department. The Richland Police Department Bomb Squad provided all of
16 the explosives and demolition material, wired the explosives, and performed
17 all of the actual detonations. A solid waste engineering organization
18 coordinated all of the onsite activities for the Hanford Site contractors,
19 handled the chemicals, and placed the explosives. The Hanford Patrol provided
20 security to prevent inadvertent intrusion by personnel not participating in
21 the demolition activity. The Hanford Fire Department was present to render
22 assistance in case of an accident.
23

24 Before each detonation event, a small demolition pit was excavated using
25 a hand shovel. The discarded chemicals were placed at the bottom of the
26 demolition pit, with the explosives situated around and on top of the
27 chemicals. Once the blasting area was cleared, the explosives and the
28 discarded chemicals were detonated using electric blasting caps and primer
29 cord. Following each detonation, the solid waste engineering personnel would
30 inspect the Ash Pit Demolition Site to ensure that the discarded chemicals
31 were consumed by the detonation. However, at the time of these activities, no
32 official records were kept.
33

34 Similar detonation events were conducted at the 218-E-8 Borrow Pit
35 Demolition Site and at the Hanford Patrol Academy Demolition Sites.

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4.0 WASTE CHARACTERISTICS 4-1
4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE 4-1
4.2 WASTE FORMS TREATED AT THE ASH PIT DEMOLITION SITE 4-1

TABLE

4-1. Inventory of Known Chemicals Detonated at the
200 West Ash Pit Demolition Site T4-1

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4.0 WASTE CHARACTERISTICS

This chapter addresses the waste inventory and waste forms treated at the Ash Pit Demolition Site.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

The Ash Pit Demolition Site was a two-time use site. The demolition activities were limited to two detonation events in 1984 and 1986; hence, waste was never stored at the Ash Pit Demolition Site. The known inventory of chemicals that were detonated is listed in Table 4-1. The maximum inventory is the sum of those chemical quantities expressed in Table 4-1.

4.2 WASTE FORMS TREATED AT THE ASH PIT DEMOLITION SITE

All waste is designated in the Part A. The chemical waste treated at the Ash Pit Demolition Site was assumed to be reactive or explosive at the time of treatment.

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Table 4-1. Inventory of Known Chemicals Detonated at the
200 West Ash Pit Demolition Site. (sheet 1 of 3)

Date	Chemical identification	CAS number	Quantity (kg)	Flash point °C (°F)	Vapor pressure 20 °C mm Hg	Dangerous waste number	Information source*
Nov. 1984	benzene	71-43-2	9.47	-11 (12)	75	WT02, U019, WC01, D001, D018	E
	bis(2-chlorethoxy) ethane	112-26-5	3.28	121 (250)	0.1	WT02, WP01	D,R
	bromobenzene	108-86-1	17.29	51 (124)	5.0 @ 27.8 °C	WT02, WP01, D001	D,R
	2-butoxyethanol	111-76-2	3.28	62 (143)	0.76	WT02	D,R
	cyclohexane	110-82-7	3.61	-20 (-4)	95	U056, D001	D,R
	diisopropyl benzene	577-55-9	6.61	76.6 (170)	No data	WT02	D,R
	1, 4 dioxane	123-91-1	4.69	12 (54)	27	WT02, U108, WC01, D001	D,R
	ethylene glycol monoethyl ether	110-80-5	1.05	42 (108)	3.8	WT02, D001	D,R
	glycerin	56-81-5	7.52	160 (320)	.0025 @ 50 °C	Nonregulated	D, #
	naphtha	8030-30-6	1.17	-50 (-57)	40	D001	D,R
	nitromethane	75-52-5	3.94	35 (95)	27.8	WT02, D001, D003	D,R
	tetrahydrofuran	109-99-9	15.79	-14 (6)	145	WT02, U213, D001	D,R
	tetrahydronaphthalene	119-64-2	6.58	71 (160)	1.0 @ 38 °C	WT02	D,R
June 1986	acrolein	107-02-8	0.4	-17 (-2)	220	WT01, P003	D,R
	aluminum chloride	7446-70-0	0.45	Not flammable	1.0 @ 100 °C	WT02, D002, D003	D,R
	2-butoxyethanol	111-76-2	0.95	62 (143)	0.76	WT02	D,R
	chromium metal powder	7440-47-3	0.45	No data	1.0 @ 1616 °C	D007	D,R
	dimethyl hydrazine	57-14-7	0.01	-15 (5)	157 @ 25 °C	WT02, U098, WC01, D001	D,R
	ethyl ether	60-29-7	28	-45	442	WT02, U117, D001	D,R
	hydrazine	302-01-2	1	38 (100)	10.4	WT02, U133, WC01, D001, D002, D003	D,R
	isopropyl ether	108-20-3	1	-28 (-18)	130	WT02, D001	D,R
	lithium hydride	7580-67-8	0.23	No data	0	D001, D003	D,R

Table 4-1. Inventory of Known Chemicals Detonated at the
200 West Ash Pit Demolition Site. (sheet 2 of 3)

Date	Chemical identification	CAS number	Quantity (kg)	Flash point °C (°F)	Vapor pressure 20 °C mm Hg	Dangerous waste number	Information source*
1	p-nitrobenzoyl chloride	122-04-3	0.1	No data	Negligible	Nonregulated	D,R
2	phenyl ether	101-84-8	0.24	115 (239)	.02 @ 25 °C	WT02, D001	D,R
3	picric acid	88-89-1	0.2	150	1	D003	D,R
4	picryl chloride	88-88-0	0.3	No data	No data	D003	D,R
5	sodium peroxide	1313-60-6	0.34	No data	No data	D001, D003	D,R
6	tetrahydrofuran	109-99-9	6.1	-14 (6)	145	WT02, U213, D001	D,R
7	triethylborane in hexane	97-94-9	0.5	35.5 (-32)	No data	WT02, D001, D003	D,R
8	benzene (20%)	71-43-2	Total amt. 5.0	-11 (12)	75	WT02, U019, WC01, D001, D018	D,R
9	ethyl acetate (20%)	141-78-6		-4	73	U112, D001, D003	
10	ethyl ether (10%)	60-29-7		-45	442	WT02, U117, D001	
11	hydrogen sulfide (1.0%)	7783-06-4		No data	15200 @ 25 °C	U135, D001	
12	methanol (29%)	67-56-1		11 (52)	97.25	WT02, U154, D001	
13	tetrahydrofuran (10%)	109-99-9		-14 (6)	145	WT02, U213, D001	
14	toluene (10%)	108-88-3		4 (40)	22	WT02, U220, D001	
15	benzene	71-43-2	Total amt. 4.0	-11 (12)	75	WT02, U019, WC01, D001, D018	D,R
16	ethyl acetate	141-78-6		7.2	73	U112, D001, D003	
17	ethyl ether	60-29-7		-45	442	WT02, U117, D001	
18	petroleum ether	8032-32-4		0.0 (32)	No data	D001	
19	toluene	108-88-3		16	22	WT02, U220, D001	
20	di-ethyl ether (50%)	60-29-7	Total amt. 4.0	-45 (-49)	442	WT02, U117, D001	
21	heptane (50%)	142-82-5		-4 (25)	40	D001	
22	allyl magnesium bromide (22%)	1730-25-2	Total amt. 1.0	No data	No data	No data	

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4	5.0 GROUNDWATER MONITORING	5-1
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5.0 GROUNDWATER MONITORING

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4 In accordance with the Tri-Party Agreement groundwater in the 200 West
5 Area will be included in the 200-UP-1 groundwater operable unit and will be
6 investigated under the CERCLA remedial investigation/feasibility study
7 process. Therefore, groundwater monitoring is not addressed as part of the
8 Ash Pit Demolition Site closure plan. Work on the 200-UP-1 groundwater
9 operable unit is scheduled to begin in fiscal year 1993.

10
11 In addition, it is considered extremely unlikely that the demolition site
12 chemicals interacted with groundwater because (1) rainfall at the Hanford Site
13 is slight, thus limiting contaminant migration, and (2) it is believed that
14 all significant quantities of chemicals were destroyed in the explosion or
15 volatilized to the atmosphere.

16
17 The remedial action objectives for this operable unit will be based on
18 the following general objectives.

- 19
20 • Protecting human health by ensuring that applicable or relevant and
21 appropriate requirements will not be exceeded and health risks, as
22 determined through analysis of all exposure pathways, will be kept at
23 or below acceptable limits.
24
25 • Ensuring acceptably low risks to the environment, such as Columbia
26 River biota.
27
28

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS 6-1

6.1 CLOSURE STRATEGY 6-1

6.2 CLOSURE PERFORMANCE STANDARDS 6-2

6.2.1 Minimize the Need for Future Maintenance 6-2

6.2.2 Protect Human Health and the Environment 6-2

6.2.3 Return Land to the Appearance and Use of
Surrounding Land 6-2

6.3 CLOSURE ACTIVITIES 6-3

FIGURE

6-1. Closure Strategy Flowchart F6-1

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1 **6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS**
2
3

4 This chapter describes the closure strategy, closure performance
5 standards, and closure activities.
6
7

8 **6.1 CLOSURE STRATEGY**
9

10 The closure investigation began by performing a radiation survey at the
11 Ash Pit Demolition Site. The results of the radiation survey confirmed that
12 there is no radioactivity above background at the Ash Pit Demolition Site.
13 Any radiation above background levels at the Ash Pit Demolition Site would
14 have been from activities other than Ash Pit Demolition Site activities.
15

16 Soil samples will be taken at and adjacent to the Ash Pit Demolition Site
17 and analyzed as described in Chapter 7.0. The analytical results will be
18 evaluated and compared with action levels for constituents of concern to
19 determine the extent of contamination. The basis for determining chemical
20 ownership is the list of analytes of interest found in Chapter 7.0, Table 7-1,
21 that takes into account the waste inventory, reactive byproducts, and chemical
22 degradation. Only analytes listed in Table 7-1 are traceable to the Ash Pit
23 Demolition Site activities. If at any time an imminent hazard is posed at the
24 Ash Pit Demolition Site, an expedited response will result to ensure worker
25 safety.
26

27 Action levels are concentrations of analytes of interest that prompt an
28 action, such as soil removal/treatment or further evaluation. Initial action
29 levels will be the greater of two levels: background or limit of
30 quantitation. Background will be Site-wide background threshold values as
31 defined in *Hanford Site Soil Background* (DOE/RL 1992a). The limit of
32 quantitation is the level above which quantitative analysis can be obtained
33 with a specific degree of confidence (generally the mean background signal
34 plus 10 standard deviations). If concentrations exceed initial action levels,
35 health-based action levels will be assessed.
36

37 The health-based levels will be based on equations and exposure
38 assumptions presented in the *Hanford Site Baseline Risk Assessment Methodology*
39 (DOE/RL 1992b). For noncarcinogens, the principal variable relating human
40 health to action levels is the oral reference dose, and the oral reference
41 dose is defined as the level of daily human exposure at or below which no
42 adverse effect is expected to occur during a lifetime. For carcinogens, the
43 cancer slope factor is the basis for determining human health effects; it is
44 measurement of risk per unit dose. The oral reference dose and cancer slope
45 factor are chemical specific and are obtained from the *Integrated Risk*
46 *Information System* (EPA 1991), a database that is updated periodically by the
47 EPA. Health-based levels will be based on values that are current at the time
48 of approval of this closure plan.
49

50 If action levels are exceeded, follow-up activities could include such
51 things as limited soil removal or coordination of soil remediation with the

1 CERCLA cleanup process. The closure strategy for the Ash Pit Demolition Site
2 is depicted in a flow diagram in Figure 6-1.

3 4 5 **6.2 CLOSURE PERFORMANCE STANDARDS**

6
7 The closure performance standards in WAC 173-303-610(2) require the owner
8 or operator to close the TSD unit in a manner that:

9
10 "(a)(i) Minimizes the need for further maintenance;

11
12 (ii) Controls, minimizes or eliminates to the extent necessary to
13 protect human health and the environment, postclosure escape of
14 dangerous waste, dangerous constituents, leachate, contaminated
15 run-off, or dangerous waste decomposition products to the ground,
16 surface water, ground water, or the atmosphere; and

17
18 (iii) Returns the land to the appearance and use of surrounding
19 land areas to the degree possible given the nature of the previous
20 dangerous waste activity."

21 22 23 **6.2.1 Minimize the Need for Future Maintenance**

24
25 The closure performance standard in WAC 173-303-610(2)(a)(i) requires the
26 owner or operator of a TSD unit to close the site in a manner that minimizes
27 the need for further maintenance. As discussed in Section 6.1, the strategy
28 proposed for closure (i.e., that the site is clean by demonstration that the
29 contaminants are below action levels or waste removal) will minimize the need
30 for future maintenance.

31 32 33 **6.2.2 Protect Human Health and the Environment**

34
35 The Ash Pit Demolition Site is to be closed. Consistent with this intent
36 and strategy, the following actions will be/or have been taken (as necessary)
37 in advance of closure certification.

- 38
39 • The closure area was radiologically surveyed.
40
41 • Surface soils will be sampled for dangerous waste constituents.
42
43 • If necessary, contaminated soil will be removed to reduce constituent
44 concentrations in site surface soils to acceptable soil cleanup values
45 as determined by methods prescribed in WAC 173-340 and implemented by
46 the *Hanford Site Baseline Risk Assessment Methodology* (DOE-RL 1992a).
47
48

49 **6.2.3 Return Land to the Appearance and Use of Surrounding Land**

50
51 In accordance with WAC 173-303-610(2)(a)(iii), the owner or operator of a
52 TSD unit is required to close the unit in a manner that returns the land to

1 the appearance and use of surrounding land areas to the degree possible given
2 the nature of the previous dangerous waste activity.

3
4 When closure of the Ash Pit Demolition Site is accomplished, the
5 site will be returned to the appearance and continued use of the
6 surrounding 200 West Ash Pit Demolition Site, in accordance with
7 WAC 173-303-610(2)(a)(iii).
8
9

10 6.3 CLOSURE ACTIVITIES

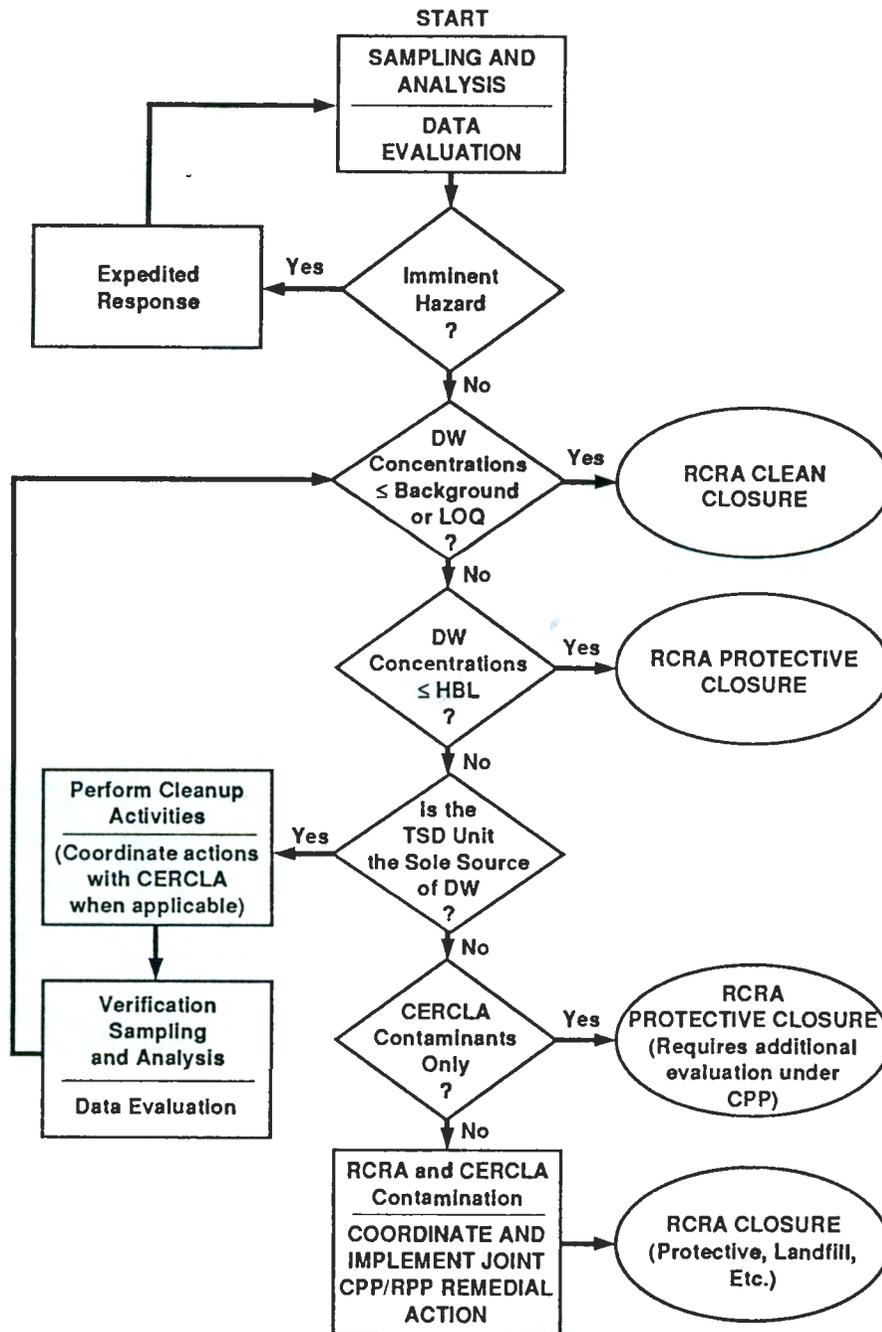
11 The general closure activities are as follows.

- 12 • Perform radiological survey.
- 13
- 14 • Collect soil samples from within the Ash Pit Demolition Site and from
15 surrounding soils. Sample locations and collection methods are
16 discussed in Chapter 7.0, Section 7.2.3.
- 17
- 18 • Analyze samples in accordance with EPA-approved procedures and
19 evaluate analysis results. Samples will be analyzed in an onsite
20 mobile laboratory capable of performing to EPA Analytical level III
21 standards.
22
- 23 • Compare analysis results to action levels to determine the extent of
24 contamination to determine the presence or absence of contaminants or
25 to facilitate decisions concerning remediation.
26
- 27 • If contamination levels for all constituents of concern listed in
28 Chapter 7.0, Table 7-1, are below the action level, the Ash Pit
29 Demolition Site will be closed.
30
- 31 • If contamination at the Ash Pit Demolition Site is above the action
32 level in the near-surface soils, one of the following actions will be
33 taken. (The action level for the Ash Pit Demolition Site is when
34 contamination is above both background concentrations and health-based
35 standards.)
36
 - 37 - If the contamination is from Ash Pit Demolition Site activities
38 only, soil will be treated and/or disposed of in a RCRA-compliant
39 landfill.
 - 40 - If the soil is contaminated with dangerous waste constituents from
41 other sources in addition to Ash Pit Demolition Site activities, the
42 soil will be remediated in coordination with CERCLA activities.
 - 43 - If the soil is contaminated from sources other than Ash Pit
44 Demolition Site activities, the site will no longer be a RCRA site,
45 and remediation will occur under CERCLA as part of 200-SS-2 operable
46 unit.
47
- 48
- 49
- 50
- 51

1 All equipment used in performing closure activities will be
2 decontaminated or disposed of at a RCRA-compliant facility.
3

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

9 3 1 2 7 5 2 1 2 0 5



Background = Hanford Site-wide background threshold (upper limit range of concentrations) for soil (DOE-RL 1992b).
 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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7-1. Soil Sample Locations for the 200 West Ash Pit
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TABLE

7-1. Proposed Analytes of Interest, Analytical Methods and
Recommended Holding Time Limits for Investigative
Soil Sampling 200 West Ash Pit Demolition Site T7-1

9 3 1 2 7 5 2 1 2 0 9

7.0 CLOSURE ACTIVITIES

This chapter describes the proposed closure activities for the Ash Pit Demolition Site. In conformance with Chapter 6.0, this chapter provides specific field sampling and laboratory analytical procedures that will be applied to identify the soil contamination (if any) that originated at the Ash Pit Demolition Site. When validated, the analytical results will be used to determine the appropriate closure strategy (as presented in Chapter 6.0 and illustrated in Figure 6-1). The soil 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 the sampling and analysis plan.

7.1 SITE RADIOLOGICAL SURVEY

A radiological survey of the Ash Pit Demolition Site was performed to confirm that the site is substantially free of radiological contaminants [i.e., that radiological activity in surface soils is below levels requiring (1) management of the area as a radiologically contaminated site, (2) control of work at the site by the radiation work permit process, or (3) wearing of prescribed protective clothing and/or respiratory protection].

7.2 SOIL SAMPLING AND ANALYSIS

Soil samples will be collected and analyzed in an onsite mobile analytical laboratory to assess whether dangerous waste constituents are present in surface soils at the Ash Pit Demolition Site. 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

1 instantaneous chemical transformation when detonation is initiated, which
2 liberates large quantities of heat or heat and gas, thus producing an
3 explosion. Detonation is distinct from combustion. By themselves, many
4 primary and highly explosives will not support combustion. Primary explosives
5 are sensitive to both heat and shock. High explosives generally exhibit
6 sensitivity to shock only, and generally must receive a relatively strong
7 shock, as from a primary explosive, to detonate. Primary and high explosives
8 are characterized by a property termed brisance, referring to the production
9 of a shock wave during detonation, due to the characteristically high
10 propagation velocities involved.

11
12 Chemicals that were identified as candidates for demolition at the Ash
13 Pit Demolition Site included strong oxidizers and reducing agents (i.e., low
14 explosives when combined), chemicals such as ethers and furans that are highly
15 flammable and form shock-sensitive degradation products, and chemical
16 compounds that were recognized as primary or high explosives or chemical
17 cognates of such explosives.

18
19 The Ash Pit Demolition Site demolition events could be characterized as
20 follows.

- 21
22 • Initiation by a primary explosive, resulting in propagation of a
23 shock wave through the mass of chemical containers. The shock wave
24 would have caused any other primary or high explosive chemicals
25 present to detonate.
- 26
27 • Nonexplosive chemicals would be dispersed (in the case of solids) or
28 atomized (in the case of liquids), directed upward (the only
29 unconfined direction) by the partial confinement of the shallow pit,
30 and ignited by the heat released by the explosion, causing the
31 fireball. The explosion also could have had the effect of ionizing
32 (fragmenting) some of the chemicals that were present.
- 33
34 • The shock wave from the explosion and the expanding gases from the
35 fireball would have caused unreacted residues (if any) to be dispersed
36 over an unspecified area.

37
38 Some chemicals residues can remain in the surface soil for many years.
39 However, in the intervening time since the most recent demolition event took
40 place, volatile organic residues in the soil might have been lost to the
41 atmosphere by vaporization. Unreacted volatiles and semivolatiles also might
42 have been eliminated from the soil column, all or in part, by microbial
43 activity.

44
45 The primary objective of soil sampling will be to determine whether
46 dangerous waste contaminants are present in surface soils at the Ash Pit
47 Demolition Site at levels exceeding the proposed action levels. Potential
48 contaminants (i.e., analytes of interest) for sample analysis can be
49 distinguished based on the waste inventory constituent list for the Ash Pit
50 Demolition Site. Analytical methods are required that provide the
51 capabilities to identify and quantitate these constituents if the constituents
52 are present in the soil.

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

10
11 It is generally acknowledged that detonation and thermal destruction are
12 very efficient processes, and that any dangerous waste constituents that might
13 remain in the soil at the closure area probably would exist at very low
14 concentrations, such that detection might be difficult. Therefore, a
15 sufficiently conservative EPA analytical support level (level III) will be
16 invoked during initial sampling and analysis to minimize concerns that
17 dangerous waste concentrations above the proposed action levels could go
18 undetected. Followup sampling (as needed) might be carried out with portable
19 field screening instruments (level I or II) to determine the areal extent and
20 distribution of any contamination when, and if, it is determined that a
21 reduced level of analytical support is justifiable and consistent with the
22 overall data quality objectives of the project.

23
24 Data quality objectives are developed to describe the overall level of
25 uncertainty in environmental data that decision-makers are willing to accept.
26 Typically, data quality requirements are specified in terms of objectives for
27 precision, accuracy, representativeness, comparability, and completeness.
28 Project-specific data quality objectives for Ash Pit Demolition Site soil
29 sampling activities are identified in Section 7A.3 of Appendix 7A.

30 31 32 **7.2.2 Analytical Parameters**

33
34 As indicated in Chapter 4.0, Table 4-1, the detonation events at the Ash
35 Pit Demolition Site included a variety of organic and inorganic constituents
36 that were (or were suspected to be) characteristic ignitable, corrosive,
37 and/or reactive waste (as defined in WAC 173-303-090). The majority of the
38 chemical compounds were of two general types: (1) organic chemicals that form
39 unstable degradation products (e.g., ethers and furans that produce shock-
40 sensitive peroxides); and (2) reactive powdered metals and metal salts.

41
42 Analytes of interest for soil sampling are listed in Table 7-1, together
43 with proposed analytical methods for quantification. The organic analytes
44 include one target compound list (TCL) compound: methyl ethyl ketone. For
45 TCL compounds, gas chromatograph/mass spectrometer devices are calibrated to
46 perform both identification and quantitation functions. Other volatile and
47 semivolatile organics can be identified, but the gas chromatograph/mass
48 spectrometer system lacks the calibration information to perform quantitation.
49 These other volatile and semivolatile compounds are referred to as
50 'tentatively identified compounds' (TIC)s. Quantitative analyses of TICs can
51 be performed with the gas chromatograph/mass spectrometer. However, the
52 device must be calibrated separately for each TIC analyte of interest. To do

1 so requires either onsite preparation or acquisition from a commercial
2 supplier of individual calibration standards for each TIC.

3
4 Direct quantitation will be performed for methyl ethyl ketone. For the
5 TICs listed in Table 7-1, the following analytical strategy is proposed.
6 Initially, samples will be analyzed qualitatively by gas chromatograph/mass
7 spectrometer and by separate gas chromatograph units with multiple detectors
8 that provide enhanced sensitivity for various classes of organics. If
9 qualitative analyses indicate that one or more TICs are present in detectable
10 concentrations, calibration standards will be prepared or procured to
11 facilitate quantitation of these compounds.

12
13 Two of the volatile organics listed as TICs in Table 7-1 (acrolein and
14 dioxane) are difficult to quantitate by purge and trap-gas chromatograph/mass
15 spectrometer because they exhibit poor purging characteristics in the
16 apparatus. For these analytes, purge and trap-gas chromatograph/mass
17 spectrometer will be used for qualitative analysis only. If they are
18 detected, quantitation will be carried out by an alternative method, such as
19 SW-846 method 8030 for acrolein and/or SW-846 method 8015 for dioxane
20 (EPA 1990b).

21
22 Polar (i.e., water soluble) organic analytes of interest will be analyzed
23 by aqueous extraction from soil followed by direct aqueous injection into a
24 gas chromatograph with multiple detectors. To prepare for quantitative
25 analysis, it will be necessary to procure calibration standard solutions
26 containing the analytes of interest.

27
28 Table 7-1 includes only one inorganic analyte, chromium. Total chromium
29 will be analyzed by x-ray fluorescence. If chromium concentrations are
30 sufficiently high to warrant doing so (i.e., if concentrations are within an
31 order of magnitude of the proposed action level for chromium), separate
32 analysis for Cr^{6+} by ion chromatography will also be performed.

33
34 Several waste inventory constituents identified in Chapter 4.0 do not
35 appear in Table 7-1. The rationale for modifications and deletions to the
36 analyte list are discussed as follows.

- 37
38 • Several inventory constituents would have reacted immediately on
39 contact with any available oxygen and/or moisture in the air or
40 the soil. Such constituents would include hydrazine, dimethyl-
41 hydrazine, triethyl borane, allyl magnesium bromide, and p-nitro-
42 benzoyl chloride.
- 43
44 • Hydrazine and dimethylhydrazine are strong reducing agents
45 (Merck 1989; Sax and Lewis 1987; and Aldrich 1986) and would have
46 been destroyed.
- 47
48 • Triethyl borane would have undergone immediate oxidation (Sax and
49 Lewis 1987; Aldrich 1986). Boric oxide dust suspended in air
50 might represent a respiratory hazard (threshold limit value =
51 10 milligrams per cubic meter) (Sax and Lewis 1987). However,

1 boric oxide in soil appears to pose no specific environmental
2 concern. Boric oxide is not a listed waste in WAC 173-303-9905.
3

- 4 • Allyl alcohol and p-nitrobenzoic acid are the expected
5 degradation products of allyl magnesium bromide and
6 p-nitrobenzoyl chloride respectively. The degradation products
7 are identified as corresponding analytes of interest in
8 Table 7-1.
9
- 10 • Glycerin is a listed inventory constituent. However, glycerin
11 was not carried forward as an analyte of interest because it is
12 not a listed or characteristic waste.
13
- 14 • Aluminum chloride in the anhydrous form is toxic and reactive
15 (Merck 1989; Sax and Lewis 1987). However, any residual
16 unreacted $AlCl_3$ in soil would be in either the hydrated or ionic
17 form, which are environmentally benign. Hydrogen sulfide was
18 present as a 1 percent constituent in approximately 11 pounds
19 (5 kilograms) of mixed organic solvents. Hydrogen sulfide
20 exhibits a relatively low boiling point [-142 °F (-61 °C)] and
21 very high vapor pressure (greater than 15,000 millimeters per
22 mercury) characteristics. Given the small initial quantity, the
23 volatility and flammability characteristics, and the mode of
24 disposal, it is considered highly unlikely that this compound
25 could be present in identifiable concentrations in soils at the
26 site. Lithium hydride is a strong reducing agent that is
27 pyrophoric and reactive with water (Merck 1989; Sax and
28 Lewis 1987; and Aldrich 1986). It is infeasible that LiH could
29 persist in soils in unreacted form. The reaction products, Li^+
30 and OH^- ions, are environmentally benign. Sodium peroxide is
31 corrosive and reactive with water (Merck 1989; Sax and
32 Lewis 1987; and Aldrich 1986). Any residual sodium peroxide in
33 soil following demolition events would react with soil moisture
34 to form sodium hydroxide, which is environmentally benign in
35 trace quantities. Based on the foregoing assessments, aluminum
36 chloride, hydrogen sulfide, lithium hydride, and sodium peroxide
37 were excluded from Table 7-1 as analytes of interest.
38
39

40 7.2.3 Sampling Methodology

41
42 The following sections discuss sample locations, background samples, and
43 analytical instrumentation and procedures.
44

45 **7.2.3.1 Sample Locations.** At a minimum, soil samples will be taken from the
46 11 locations indicated in Figure 7-1. The minimum numbers and types of
47 samples to be collected and submitted for analysis will consist of the
48 following:
49

- 1 • One authoritative sample will be collected at the site center
- 2
- 3 • Five samples will be collected from predetermined random locations
- 4 within the site boundary. A random number algorithm was used to
- 5 select these locations
- 6
- 7 • Five samples will be collected from locations outside the site
- 8 boundary. These locations also were selected with the aid of a random
- 9 number algorithm
- 10
- 11 • Surface samples will be collected from two of the 11 locations
- 12
- 13 • Two samples will be split in the field, placed in separate containers,
- 14 and submitted as duplicates for quality assurance and quality control
- 15 purposes
- 16
- 17 • Three blanks, consisting of an equipment blank, a field blank, and a
- 18 trip blank, will be collected and submitted for analysis with the soil
- 19 samples and splits. Blanks will consist of pure silica sand.
- 20

21 Soil samples will be removed from the specified locations for qualitative
22 and quantitative analyses in an onsite mobile laboratory. Sampling will be
23 performed in conformance with EII 5.2, Appendix E (WHC 1988a). Samples will
24 be collected manually, using decontaminated, stainless steel hand tools. At
25 each location to be sampled, the uppermost 6 inches (15 centimeters) of soil
26 will be removed. Samples will be taken from the interval 6 to 18 inches
27 (15 to 46 centimeters) below grade. Chemical residues from the demolition
28 events would have been deposited at the surface of the soil column. Over
29 time, the soluble constituents would have undergone gradual removal by
30 successive wetting fronts (from rainfall and snowmelt events), and redeposited
31 lower in the soil profile. With the proposed sampling approach, leachable or
32 otherwise mobile constituents that might have been reduced to concentrations
33 below detectable levels at the soil surface could still be detected below
34 grade. If volatile organics remain in the site soils, they should be more
35 readily detectable at shallow depths below the soil surface, rather than at
36 the surface itself. Two additional samples will be collected from the 0- to
37 6-inch (0- to 15-centimeter) interval at the locations shown in Figure 7-1 to
38 verify that contaminants do not persist as insoluble or immobile residues at
39 the soil surface.

40
41 All soil samples (including blanks and duplicates) will receive
42 preassigned sample numbers in conformance with EII 5.10, "Obtaining Sample
43 Identification Numbers and Accessing Hanford Environmental Information System
44 (HEIS) Data" (WHC 1988a). The sample volume required for each soil sample
45 will be 2 pounds (1.0 kilogram) [4 pounds (2.0 kilograms) for samples that
46 will be split]. The samples will be chilled with ice. Samples will be stored
47 temporarily and transported to the analytical laboratory in an ice chest.
48 Recommended holding time limits for samples are listed by analyte/analytical
49 method in Table 7-1.

50
51 **7.2.3.2 Background Samples.** A Hanford Site-wide assessment of natural
52 constituent background levels has been performed for the Hanford Site

1 (WHC 1991a; WHC 1991b). The majority of dangerous waste constituents
2 detonated at the site were organic chemicals, for which background values will
3 be assumed to be negligibly small. For these constituents, concentration data
4 will be compared to respective laboratory quantitation limits rather than
5 background. A few compounds on the waste inventory list contained inorganic
6 metal and halide elements. Residues from these compounds could include
7 oxides, metal cations, and/or various anions with non-zero background values.
8 Results from the Hanford Site-wide assessment will be available for use in
9 data interpretation. No independent assessment of local background values is
10 planned to support closure. The adequacy of available Hanford Site-wide
11 background data for site-specific contaminants will be evaluated in
12 conjunction with the interpretation of soil sample analytical results.
13 Additional soil sampling to evaluate local background could be performed if
14 necessary.
15
16

17 7.2.4 Analytical Instrumentation and Procedures

18
19 The onsite mobile laboratory will be equipped with the following
20 principal analytical instrumentation:
21

- 22 • Gas chromatograph (GC) - configured for multiple detectors as follows:
23 - Photoionization detector (PID) - screening for aromatics,
24 unsaturated aliphatic compounds, chlorinated solvents
25
26 - Flame ionization detector (FID) - screening for volatile organic
27 compounds
28
29 - Electron capture detector (ECD) - screening for halogenated
30 compounds, pesticides, polynuclear aromatic hydrocarbons, and other
31 semivolatiles
32
33
- 34 • Gas chromatograph/mass spectrometer (GC/MS) - quantitative analyses of
35 volatile, semivolatile and nonvolatile organic compounds. The gas
36 chromatograph/mass spectrometer analyses will be supported by the
37 following concentration/extraction systems:
38 - Purge and trap unit - extraction of volatile organic compounds
39
40 - Supercritical fluid extraction (SFE) unit - extraction of
41 semivolatile and nonvolatile organics
42
43
- 44 • X-Ray fluorescence (XRF) spectrometer - screening and quantitative
45 analyses for metals.
46
- 47 • Ion chromatograph (IC) - quantitative analyses for cations and anions.
48

49 The onsite mobile laboratory gas chromatograph unit is specifically
50 configured for operation of multiple detectors (i.e., photoionization
51 detector, flame ionization detector, and electron capture detector) in series.
52 This series configuration will be used to screen for organics in advance of

1 quantitative analysis by gas chromatograph/mass spectrometer. Specified
2 method detection limits for the photoionization detector, flame ionization
3 detector, and electron capture detector units are 100 micrograms per kilogram
4 (parts per billion) (soil). Procedures for calibration, standardization, and
5 maintenance of the gas chromatograph photoionization detector, flame
6 ionization detector, and electron capture detector system will be based on
7 onsite mobile laboratory procedures, and published EPA methods.

8
9 Procedures for calibration, standardization, and maintenance of the gas
10 chromatograph/mass spectrometer system and associated extraction systems will
11 be based on the following published methods:

12
13 For volatile organics:

- 14
- 15 • SW-846 Method 5030--Sample preparation by the purge and trap method
- 16
- 17 • SW-846 Method 8240--Volatile organic compounds by gas
18 chromatograph/mass spectrometer: packed column technique
- 19
- 20 • SW-846 Method 8260--Volatile organic compounds by gas
21 chromatograph/mass spectrometer: capillary technique
- 22

23 For semivolatile organics:

- 24
- 25 • SW-846 Method 8250--Semivolatile organic compounds by gas
26 chromatograph/mass spectrometer: packed column technique
- 27
- 28 • SW-846 Method 8270--Semivolatile organic compounds by gas
29 chromatograph/mass spectrometer: capillary technique.
- 30

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

38
39 The x-ray fluorescence technique is a rapid-turnaround, nondestructive
40 test method for metals (specifically, metals with atomic numbers greater than
41 11). The onsite mobile laboratory x-ray fluorescence system configuration
42 will include vacuum pump, power source, soil grinder, sample preparation
43 materials, and metal standards. The onsite mobile laboratory procedure will
44 reference Method FM-2 (EPA 1988). Specified detection limits for target
45 metals specifically regulated under the National Pollution Discharge
46 Elimination System, RCRA, and the *Clean Water Act of 1977* will be
47 20 micrograms per gram.

48
49 Onsite mobile laboratory analyses for Na^+ , NH_4^+ , K^+ , Mg^{++} , Ca^{++} , Cr^{+6} , NO_3^- ,
50 NO_2^- , Cl^- , F^- , Br^- , SO_4^{--} , HPO_4^{--} , and CN^- will be performed by ion
51 chromatography methods. Specified detection limits for CN^- and Cr^{+6} are
52 10 micrograms per liter. Specified detection limits for other listed ions are

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1 20 micrograms per milliliter. Ion chromatographic analyses will be performed
2 according to EPA Method 300.0 for anions (excluding CN^-), Method 300.7 for
3 cations (excluding Cr^{+6}), Method 218.6 for Cr^{+6} , and Method 353.2 for nitrogen,
4 NO_3^- and NO_2^- (EPA 1979). There currently is no EPA approved method for CN^- by
5 ion chromatography. Determinations for CN^- will follow the recommended method
6 from the ion chromatography system manufacturer.

7
8 The onsite mobile laboratory will be equipped with auxiliary
9 instrumentation for determining sample mass, pH, electrical conductivity, and
10 CO_2/CO_3 content.

11 12 13 7.2.5 Quality Assurance and Quality Control

14
15 This section summarizes the quality assurance and quality control
16 components and procedures that will be imposed on the onsite mobile laboratory
17 operation and the documentation that will be generated along with the
18 analytical data to ensure that the data will be acceptable.

19
20 The objective of the onsite mobile laboratory procurement is to provide
21 onsite, quick-turnaround screening capabilities for samples of contaminated
22 media equivalent to analytical level III. To ensure that the basic character
23 of analytical expedience of the mobile laboratory will not be compromised,
24 analytical quality assurance and quality control will be limited to procedures
25 and protocols that are appropriate for production of analytical level III
26 data.

27
28 The following quality assurance requirements will be imposed on all
29 analytical work performed by the mobile laboratory.

- 30
31
- 32 • **Duplicate samples:** Duplicate samples will be included for analysis
33 with each batch of samples. In this context, a batch of samples
34 refers to a group of samples collected during one sampling event by a
35 single method. Duplicate samples will be placed in separate
36 containers and assigned separate numbers in the field (for field
37 quality assurance purposes) or will be prepared in the laboratory by
38 dividing (splitting) an individual sample (for laboratory quality
39 control purposes).
 - 40 • **Method check samples:** A check sample will be analyzed with each batch
41 of samples. The check sample will contain a representative subset of
42 the constituents to be determined by each prescribed analytical
43 method. Check samples will be prepared with constituent
44 concentrations approaching the limit of quantification as a means of
45 continuously monitoring the accuracy and precision of the various
46 analytical methods.
 - 47 • **Column check standards:** Each batch of adsorbents used in
48 chromatographic analysis will be checked for constituent recovery by
49 running the elution pattern with standards as a column check. The
50 elution pattern will be optimized for maximum recovery of constituents
51 and maximum rejection of contaminants.
52

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- **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 between the results from duplicate samples x_1 and x_2 . The relative percent difference is computed as follows:

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

where \bar{x} is the mean of x_1 and x_2 . Acceptance criteria for relative percent difference 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, NO₃/NO₂), 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 activities, in accordance with EII 1.5, "Field Logbooks" (WHC 1988a). Information pertinent to ongoing activities at the closure area 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

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

- 9
- 10 • Total number of values
- 11 • Number of values less than detection limits
- 12 • Minimum value
- 13 • Maximum value
- 14 • Mean
- 15 • Median
- 16 • Standard deviation
- 17 • Coefficient of variation.
- 18

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

26 27 28 **7.2.9 Determination of Proposed Action Levels**

29 Action levels will be proposed for all contaminants of concern.
30 Contaminant levels will be compared against proposed action levels to assess
31 the need for remedial action. If a determination is made that some remedial
32 action will be necessary as a condition of closure, a remedial action plan
33 will be prepared. Soil cleanup action levels will be developed from Hanford
34 Site background threshold values, MTCA-based acceptable exposure level
35 information (WAC 173-340), and/or EPA soil cleanup guidance.
36
37

38 39 **7.3 REMOVAL OF CONTAMINATED SOIL**

40 If soil sampling results and assessments of remedial options should
41 indicate that soil removal might be necessary to close the Ash Pit Demolition
42 Site, this section of the closure plan will be implemented as indicated in
43 Chapter 6.0, Figure 6-1. This section describes the following activities
44 relating to soil removal:
45

- 46
- 47 • Estimating the volume of contaminated soil to be removed
- 48 • Soil removal survey control
- 49 • Soil removal operations
- 50 • Verification sampling.
- 51
- 52

1 **7.3.1 Estimating the Volume of Contaminated Soil to be Removed**
2

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

- 8
- 9 • Soil sample information will be plotted on a closure area plan
10 drawing.
- 11
- 12 • A random sampling scheme has been proposed for initial soil sampling
13 (Section 7.2.4). Supplemental sampling with portable field screening
14 instrumentation might be carried out to better define the areal extent
15 of contamination. Because contaminant concentration data typically
16 are nonuniform, and random sampling schemes typically lead to unequal
17 areas of influence around individual sample locations, it normally is
18 necessary to apply some type of weighted-area technique to determine
19 the volume of contaminated soil from the sample information. One
20 common weighing technique involves construction of a 'Thiessen
21 network' (Linsley and Franzini 1964). A Thiessen network is developed
22 on a map by connecting adjacent sample locations by straight lines and
23 erecting perpendicular bisectors to each connecting line. The polygon
24 defined by the perpendicular bisectors around a sample location
25 encloses an area that is everywhere closer to that sample location
26 than to any other.
- 27
- 28 • Polygons containing elevated levels of contaminants relative to
29 proposed action levels will be identified as contaminated areas. The
30 vertical extent of contaminated soil within each contaminated area
31 will be taken as 2 feet (0.6 meter) (conservatism added). For each
32 contaminated area, the volume of soil to be removed will be determined
33 as the product of the 2-foot (0.6-meter) depth and affected surface
34 area. The total volume of contaminated soil will be computed as the
35 sum of the volumes of the individual contaminated polygons and any
36 'surrounded' polygons.
- 37

38

39 **7.3.2 Soil Removal Survey Control**
40

41 Corner monuments installed at the site will serve as control points
42 (semipermanent reference points with known horizontal and vertical
43 coordinates) for any soil removal excavation work. The monuments also
44 provided location control for the surface radiological survey and soil
45 sampling activities. If removal of contaminated soil is necessary for clean
46 closure of the site, additional control points may be installed as needed to
47 effectively manage and document the excavation work. As preliminary actions,
48 a survey grid will be projected over the area to be excavated, and a
49 controlled drawing of the existing site topography will be prepared
50 identifying all control point positions and soil sample locations. Depending
51 upon the size and shape of the excavation area, elevation surveys and grade
52 stakes will be used (as appropriate) to control the work. The controlled

1 drawing will be modified to show the extent of soil removed and the final site
2 surface configuration. Afterward, the survey grid and the drawing(s) will
3 assist in location control and documentation for verification sampling.
4
5

6 7.3.3 Soil Removal Operations 7

8 If necessary and if the contaminated soil volume is sufficient, it is
9 envisioned that the soil removal operation will be performed using standard
10 types of earth moving equipment (e.g., grader, front-end loader, backhoe, rear
11 dump trucks, and water tanker truck). Excavation will be performed with
12 either a backhoe or a front-end loader. If needed, to minimize dust
13 generation and potential releases of contaminants, a water truck could apply
14 water periodically to the excavation area and adjacent affected areas. Dust
15 control activities will be repeated as necessary to maintain the soil in a
16 damp (but not saturated) condition sufficient to minimize or eliminate dust
17 production.
18

19 If the contaminated soil volume is small, 55-gallon (208-liter)
20 containers will be used. Alternatively, soil could be bulk loaded into rear
21 dump trucks. Trucks will be loaded in a conservative manner (with adequate
22 space remaining below the top of the dump box) to ensure that spillage and/or
23 unnecessary contamination of equipment surfaces does not occur. During truck
24 loading and transportation, standard precautions will be taken to prevent
25 airborne dispersal of materials from moving vehicles and/or the spread of
26 contaminants by spilling or dripping of contaminated solids and/or liquids. A
27 bed liner (or a truck with a continuous one-piece bed) will be used to prevent
28 leakage. After a truck is loaded, the contaminated soil will be maintained in
29 a damp condition and the load will be covered to prevent airborne
30 contamination during transportation. The amount of moisture in the soil will
31 be monitored to minimize or prevent the accumulation of free liquids in the
32 truck bed.
33

34 Contaminated soil (containerized or bulk loaded) will be transported to a
35 permitted (or interim status) disposal facility. An EPA hazardous waste
36 manifest would be prepared to document each offsite shipment of contaminated
37 soil as required in WAC 173-303-180 and 40 CFR 262. Contaminated soil will be
38 prepared for shipment (i.e., labeled, marked, and placarded) as required in
39 WAC 173-303-190. This section of the WAC incorporates by reference the
40 applicable federal regulations on hazardous waste shipments (49 CFR 172, 173,
41 178, and 179).
42

43 If soil removal is necessary, the affected area will be recontoured with
44 surrounding soils. After excavation and before recontouring of the removal
45 areas, the affected area will undergo verification sampling (Chapter 6.0,
46 Figure 6-1). Actual surface elevations will be checked against firing range
47 design elevations and calculations to ensure that the firing range can fulfill
48 its intended purpose. A final revision of the controlled closure area map
49 will be prepared to show the 'as built' configuration of the firing range.
50

51 As appropriate, the destination of any removed soil will be identified
52 within the Ash Pit Demolition Site Administrative Record. This identification

1 will be undertaken concurrently with the closure certification (Section 7.7).
2 All removed waste will be managed and disposed of in accordance with Ecology
3 regulations.
4
5

6 7.3.4 Verification Sampling 7

8 Verification sampling will be performed following soil removal to
9 establish that residual concentrations of the designated constituents are
10 below action levels (i.e., the objective of soil removal has been attained).
11 Verification samples will be taken from the newly exposed surface area
12 resulting from soil removal. It is envisioned that a simple random design
13 approach would be used to select sample locations. The number of samples to
14 be taken will depend on the extent of soil removal activities. Verification
15 samples will be analyzed in an onsite mobile laboratory. The scope of sample
16 analysis will be limited to quantifying the residual concentrations of
17 designated constituents of concern to compare these concentration values to
18 the cleanup standards. Before verification sampling, the number and location
19 of the samples and the constituents for analysis will be submitted for
20 regulatory concurrence. It is envisioned that verification samples would be
21 analyzed by the same procedures identified in Section 7.2.2.
22
23

24 7.4 PERSONNEL TRAINING 25

26 Appendix 7B contains a brief description of the training courses.
27 Training for soil sampling personnel is covered within the EIIs. All
28 personnel entering the TSD unit during closure must have 40 hours of hazardous
29 waste training (Appendix 7B). Before performing actual closure activities,
30 specific work plans will be submitted to the lead regulatory agency for
31 review. These documents will detail the specific work activities and will not
32 be written until the latest technology and specific materials and equipment
33 are known.
34
35

36 7.5 SCHEDULE FOR CLOSURE 37

38 Closure of the Ash Pit Demolition Site will begin on notification by
39 Ecology of plan approval. Closure will proceed according to the schedule
40 presented in Figure 7-2.
41

42 Official copies of the closure plan will be located at the following
43 office:
44

45 U.S. Department of Energy,
46 Richland Field Office
47 Federal Building
48 825 Jadwin Avenue
49 P.O. Box 550
50 Richland, Washington 99352.
51

1 The DOE-RL office will be responsible for amending this closure plan, as
2 deemed necessary, according to the amendment procedures in WAC 173-303-610.
3 The closure plan will be kept at the DOE-RL office until closure is complete
4 and certified.
5
6

7 **7.6 AMENDMENT OF CLOSURE PLAN**

8

9 The closure plan for the Ash Pit Demolition Site will be amended whenever
10 changes in operating plans or unit design affect the closure plan; whenever
11 there is a change in the expected year of closure; or if, when conducting
12 closure activities, unexpected events require a modification of the closure
13 plan. The closure plan will be modified in accordance with WAC 173-303-610.
14 This plan may be amended any time before certification of final closure of the
15 Ash Pit Demolition Site.
16

17 If an amendment to the approved closure plan is required, the DOE-RL will
18 submit a written request to the lead regulatory agency to authorize a change
19 to the approved plan. The written request will include a copy of the closure
20 plan amendment for approval.
21
22

23 **7.7 CERTIFICATION OF CLOSURE AND SURVEY PLAT**

24

25 Within 60 days of closure of the Ash Pit Demolition Site, the DOE-RL will
26 submit to the Benton County Auditor and the lead regulatory agency a
27 certification of closure and a duly certified survey plat. The certification
28 of closure will be signed by both the DOE-RL and a registered independent
29 professional engineer, stating that the unit has been closed in accordance
30 with the approved closure plan. The certification will be submitted by
31 registered mail or an equivalent delivery service. Documentation supporting
32 the independent registered professional engineer's certification will be
33 supplied upon request of the regulatory authority.
34

35 The DOE-RL and the independent professional engineer will certify with a
36 document similar to Figure 7-3.

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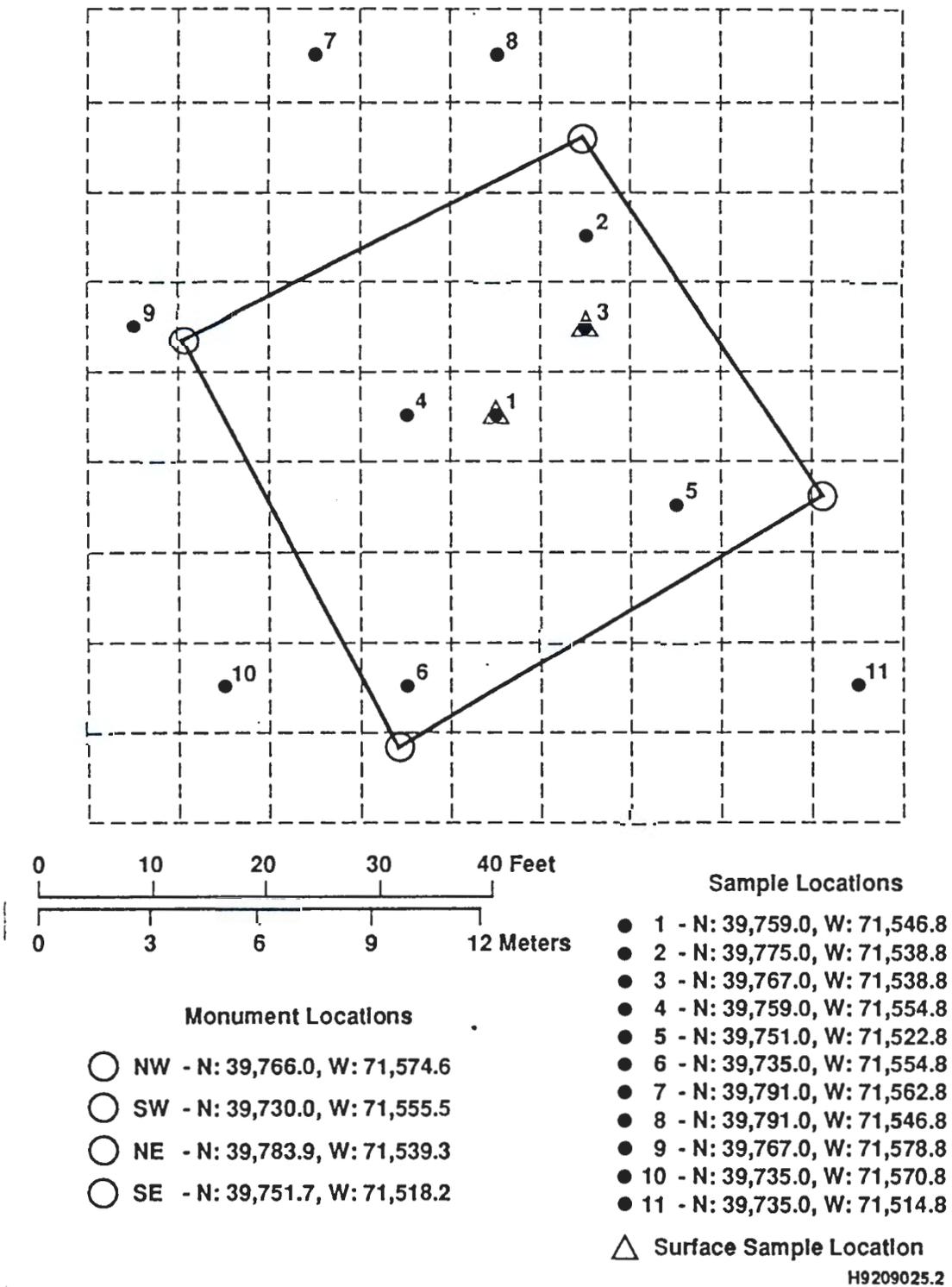
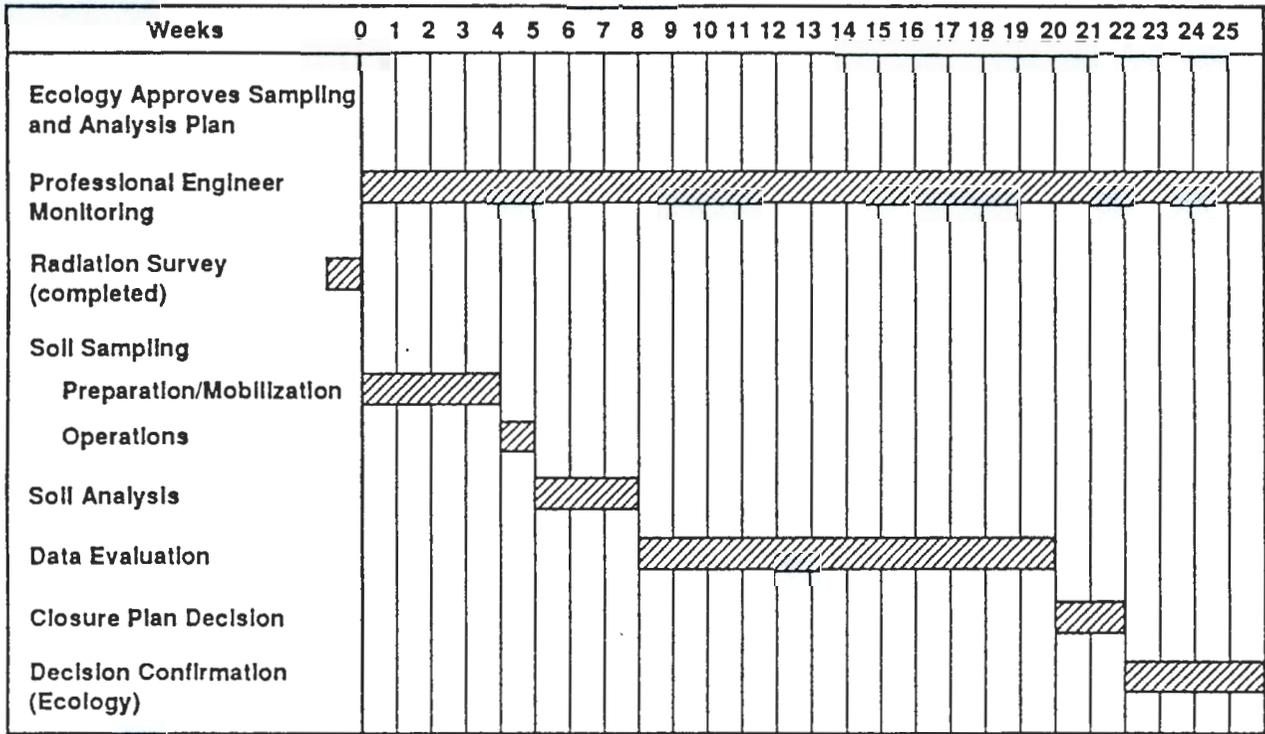


Figure 7-1. Soil Sample Locations for the 200 West Ash Pit Demolition Site.

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Figure 7-2. 200 West Ash Pit Demolition Site Closure Schedule.

**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
(Typed Name)

Date

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

Date

Figure 7-3. Typical Closure Certification Document.

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Table 7-1. Proposed Analytes of Interest, Analytical Methods and Recommended Holding Time Limits for Investigative Soil Sampling 200 West Ash Pit Demolition Site.

Analysis for Volatile Organics by Purge and Trap Followed by GC/MS (holding time = 14 days to analyze):

Target Compound List (TCL) Analytes:

- Benzene
- Toluene

Tentatively Identified Compound (TIC) Analytes:

- Acrolein (poor purging analyte)
- 1,2-Bis(2-chloroethoxy)ethane
- Bromobenzene
- 2-Butoxyethanol
- Cyclohexane
- Diisopropyl benzene
- Dioxane (poor purging analyte)
- Ethyl acetate
- Ethyl ether
- Heptane
- Hexane
- Isopropyl ether
- Naphtha (petroleum naphtha)
- Nitromethane
- Tetrahydrofuran
- Tetrahydronaphthalene

Analysis for Semivolatile Organics by Supercritical Fluid Extraction followed by GC/MS (holding time = 7 days to extract/40 days to analyze following extraction):

- Phenyl ether
- Picryl chloride

Aqueous Extraction Followed by Direct Aqueous Injection (holding time = 14 days to analyze):

- Allyl alcohol (degradation product of allyl magnesium bromide)
- n-Butyl alcohol (degradation product of butyllithium)
- Ethylene glycol monoethyl ether
- Methanol
- p-Nitrobenzoic acid (degradation product of p-Nitrobenzoyl chloride)
- Picric acid

Analysis for Metals by X-Ray Fluorescence (holding time = 6 months):

- Chromium metal, powdered

Ions by Ion Chromatography (holding time = 28 days to analyze):

- Chloride
- Sulfate
- Sulfide

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

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

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4 **8.0 POSTCLOSURE PLAN**

5 In the event that the Ash Pit Demolition Site cannot be clean closed and
6 that residual soil contamination remains after soil removal activities, a Ash
7 Pit Demolition Site postclosure permit application will be submitted in
8 accordance with WAC 173-303 regulations.
9

10 **8.1 NOTICE IN DEED BOOK**

11
12 This closure plan proposes that the Ash Pit Demolition Site be closed
13 with no residual soil contamination that would pose a threat to human health
14 or the environment. However, if closure cannot be secured, the following
15 action will be taken in accordance with WAC 173-303-610(1)(b). Within 60 days
16 of the certification of closure, the DOE-RL will sign, notarize, and file for
17 recording the notice indicated below. The notice will be sent to the Auditor
18 of Benton County, P.O. Box 470, Prosser, Washington, with instructions to
19 record this notice-in-deed book.
20

21 **TO WHOM IT MAY CONCERN**

22
23 The United States Department of Energy, Richland Field Office, an
24 operations office of the United States Department of Energy, which is a
25 department of the United States Government, the undersigned, whose local
26 address is the Federal Building, 825 Jadwin Avenue, Richland, Washington,
27 hereby gives the following notice as required by 40 CFR 265.120 and
28 WAC 173-303-610(10) (whichever is applicable):
29

- 30 (a) The United States of America is, and since April 1943, has been in
31 possession in fee simple of the following described lands: (legal
32 description of the Ash Pit Demolition Site)
33
34 (b) The United States Department of Energy, Richland Field Office, by
35 operation of the Ash Pit Demolition Site, has disposed of hazardous
36 and/or dangerous waste under other terms of regulations promulgated
37 by the United States Environmental Protection Agency and the
38 Washington State Department of Ecology (whichever is applicable) at
39 the above described land
40
41 (c) The future use of the above described land is restricted under terms
42 of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is
43 applicable)
44
45 (d) Any and all future purchasers of this land should inform themselves
46 of the requirements of the regulations and ascertain the amount and
47 nature of wastes disposed on the above property
48
49 (e) The United States Department of Energy, Richland Field Office has
50 filed a survey plat with the Benton County Planning Department and
51 with the United States Environmental Protection Agency, Region 10,
52 and the Washington State Department of Ecology (whichever are

1 applicable) showing the location and dimensions of the Ash Pit
2 Demolition Site and a record of the type, location, and quantity of
3 waste treated.
4
5

6 **8.2 POSTCLOSURE CARE**
7

8 Postclosure care is required when a TSD unit has residual contamination
9 that poses a problem to human health or the environment. At the Ash Pit
10 Demolition Site, underlying soils and possibly groundwater might have been
11 contaminated by waste treated during Ash Pit Demolition Site operations.
12 Under the Tri-Party Agreement, source contamination and groundwater operable
13 units will be investigated and remediated under the CERCLA process.
14

15 As described in Chapter 6.0, soil remediation may be deferred to the
16 CERCLA remedial investigation/feasibility study process. If the soil is
17 contaminated from Ash Pit Demolition Site detonation activities, the TSD unit
18 will not be considered closed until the remediation is complete. If closure
19 is deferred until larger-scale cleanup is implemented, the TSD unit area will
20 be inspected, at a minimum, once a year until CERCLA remediation. This
21 inspection would be combined with TSD unit inspections presently conducted.
22 The inspections would determine the need for maintenance of any temporary
23 covers or other physical barriers. Any required maintenance would be
24 performed by Hanford Site personnel.
25

26 Any data obtained from sampling and analyses during RCRA closure
27 activities will be part of the official record and included with the closure
28 plan. These data will be taken into account and used during the CERCLA
29 evaluation of the 200-SS-2 operable unit, as well as any data collected
30 specifically for the CERCLA evaluation.
31

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41 Health Administration, Washington, D.C.
42
43 40 CFR 261, "Identification and Listing of Hazardous Waste," Title 40, *Code of*
44 *Federal Regulations*, Part 261, U.S. Environmental Protection Agency,
45 Washington, D.C.
46
47 40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," Title 40,
48 *Code of Federal Regulations*, Part 262, as amended, U.S. Environmental
49 Protection Agency, Washington, D.C.
50
51 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous
52 Waste, Treatment, Storage, and Disposal Facilities," Title 40, *Code of*

1 *Federal Regulations*, Part 265, as amended, U.S. Environmental Protection
2 Agency, Washington, D.C.
3

4 40 CFR 270, "EPA Administered Permit Programs: The Hazardous Waste Permit
5 Program," Title 40, *Code of Federal Regulations*, Part 270, as amended,
6 U.S. Environmental Protection Agency, Washington, D.C.
7

8 49 CFR 172, "Hazardous Materials Tables and Hazardous Materials Communications
9 Requirements and Emergency Response Information Requirements," Title 49,
10 *Code of Federal Regulations*, Part 172, as amended, U.S. Department of
11 Transportation, Washington, D.C.
12

13 49 CFR 173, "Shippers-General Requirements for Shipments and Packaging,"
14 Title 49, *Code of Federal Regulations*, Part 173, as amended,
15 U.S. Department of Transportation, Washington, D.C.
16

17 49 CFR 178, "Shipping Container Specification," Title 49, *Code of Federal*
18 *Regulations*, Part 178, as amended, U.S. Department of Transportation,
19 Washington, D.C.
20

21 49 CFR 179, "Specifications for Tank Cars," Title 49, *Code of Federal*
22 *Regulations*, Part 179, U.S. Department of Transportation,
23 Washington, D.C.
24

25
26 **9.3 FEDERAL AND STATE ACTS**
27

28 *Atomic Energy Act of 1954*, 42 USC 2011 et seq.
29

30 *Clean Water Act of 1977*, 33 USC 1251 et seq.
31

32 *Comprehensive Environmental Response Compensation and Liability Act of 1980*,
33 as amended, 42 USC 9601 et seq.
34

35 *Resource Conservation Act of 1976*, as amended, 42 USC 6901 et seq.
36

37 *State of Washington Hazardous Waste Management Act of 1976*, Revised Code of
38 Washington, Chapter 70.105 et seq., Olympia, Washington.
39
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- 1 9.4 WASHINGTON ADMINISTRATIVE CODE AND REVISED CODE OF WASHINGTON
2
3 WAC 173-303, *Dangerous Waste Regulations*, Washington Administrative Code,
4 Washington State Department of Ecology, Olympia, Washington.
5
6 WAC 173-340, *Model Toxics Control Act Cleanup Regulations*, as amended,
7 Washington State Department of Ecology, Olympia, Washington.

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APPENDIX 3A

PHOTOGRAPHS

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92070921-7CN
(Photograph taken 1992)

200 West Ash Pit Demolition Site, Facing Southeast.

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92070921-8CN
(Photograph taken 1992)

200 West Ash Pit Demolition Site, Facing North.

APPENDIX 7A

**QUALITY ASSURANCE PROJECT PLAN FOR SOIL SAMPLING AND
ANALYSIS FOR THE 200 WEST ASH PIT DEMOLITION SITE**

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FIGURE

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7A-1. Project Organization for Sampling and Analysis for
200 West Ash Pit Demolition Site Closure Area APP 7A-F1

TABLE

7A-1. The 200 West Ash Pit Demolition Site Analytical Methods,
Analytical Support Levels, and Target Practical
Quantification Limit Values for Investigative
Soil Sampling APP 7A-T1

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1 **7A.1.2 Applicability and Relationship to the Onsite Contractor's**
2 **Quality Assurance Program**

3
4 This QAPjP applies specifically to field activities and laboratory
5 analyses to be performed in support of closure of the Ash Pit Demolition Site.
6 This QAPjP has been prepared in compliance with the *Environmental Engineering,*
7 *Geotechnology, and Permitting Function Quality Assurance Program Plan*
8 (WHC 1990a). This QAPjP describes the means selected to implement quality
9 assurance program requirements, defined in the *Quality Assurance Manual*
10 (WHC 1988b), as the requirements apply to environmental investigations, while
11 accommodating the specific requirements for project plan format and content
12 agreed upon in the Tri-Party Agreement. The project plan contains a matrix of
13 procedural resources from *Environmental Engineering, Geotechnology, and*
14 *Permitting Function Quality Assurance Program Plan* (WHC 1990a) and
15 *Environmental Investigations and Site Characterization Manual* (WHC 1988a).
16 This QAPjP is subject to mandatory review and revision in advance of
17 initiation of field sampling activities. Distribution and revision control of
18 this plan will be carried out in compliance with QR 6.0, "Document Control,"
19 and QI 6.1, "Quality Assurance Document Control" (WHC 1988b). All plans and
20 procedures referenced in this QAPjP are available for regulatory review.
21

22
23 **7A.2 PROJECT ORGANIZATION AND RESPONSIBILITIES**

24
25 Organization responsibilities are discussed in the following sections.
26

27
28 **7A.2.1 Project Management Responsibilities**

29
30 The operations contractor's Regulatory Support organization and the
31 Environmental Restoration Engineering Function have primary responsibilities
32 for conducting this investigation. An organizational chart is included as
33 Figure 7A-1. The responsibilities of key test personnel and organizations are
34 described in the following.
35

- 36 • **Dangerous Waste Closure Plan Lead (Regulatory Support Organization)--**
37 The Dangerous Waste Closure Plan Lead is responsible for the overall
38 organization of the closure plan and will interface with the
39 regulatory agencies and the U.S. Department of Energy.
40
- 41 • **Technical Lead--**The Technical Lead is responsible for overall
42 direction of sampling and testing activities; responsibilities include
43 the planning and authorization of all work and management of any
44 subcontracted activities, as well as overall technical schedule and
45 budgetary performance.
46
- 47 • **Quality Assurance Officer--**The Quality Assurance Officer is
48 responsible for coordination and/or oversight of performance to the
49 QAPjP requirements by means of internal auditing and surveillance
50 techniques. The Quality Assurance Officer retains the necessary
51 organizational independence and authority to identify conditions

1 adverse to quality and to inform the Technical Lead of needs for
2 corrective action.

- 3
- 4 • **Health and Safety Officer (Environmental Division/Environmental Field**
- 5 **Services)**--The Health and Safety Officer is responsible for
- 6 determining potential health and safety hazards from volatile and/or
- 7 toxic compounds during sample handling and sampling decontamination
- 8 activities. The Health and Safety Officer has the responsibility and
- 9 authority to halt field activities because of unacceptable health and
- 10 safety concerns.
- 11
- 12 • **Health Physics Technician**--The health physics technician is
- 13 responsible for ensuring that all monitoring and protection procedures
- 14 are being followed as required in the dangerous waste operations plan.
- 15 The health physics technician has the authority to take whatever steps
- 16 might be necessary to carry out this function.
- 17
- 18 • **Field Team Leader**--The Field Team Leader is responsible for onsite
- 19 direction of sampling technicians in compliance with the requirements
- 20 of the sampling plan (Chapter 7.0, Section 7.2), this QAPjP, and
- 21 implementing all EIIs.
- 22
- 23 • **Sample Management Organization**--The sample management organization is
- 24 responsible for procurement and coordination of analytical support
- 25 services, sample tracking through the laboratories, and receipt and
- 26 validation of analytical data as discussed in Section 7A.8.
- 27

28

29 7A.2.2 Analytical Laboratories

30

31 The field sampling team will be responsible for screening all samples for
32 gross alpha and beta/gamma radioactivity and for separating samples for
33 further analysis. Samples with levels exceeding 200 picocuries per gram
34 (total activity) or 60 picocuries per gram (alpha) will be routed to a Hanford
35 Site or participating contractor laboratory qualified to handle analysis of
36 radioactive samples. Samples exceeding 200 picocuries per gram (total
37 activity) or 60 picocuries per gram (alpha) are not expected for this
38 investigation. Samples with lower levels of radioactivity will be routed in
39 accordance with the procedures identified below for chemical samples.

40

41 Samples will be routed to an onsite participating contractor, or
42 subcontractor laboratory, who will be responsible for performing the analyses
43 identified in the sampling and analysis plan in Chapter 7.0 and Tables 7A-1
44 and 7A-2 of this plan, in compliance with work orders or contractual
45 requirements and approved procedures (Section 7A.4.1.2). At the direction of
46 the Technical Lead, services of alternate qualified laboratories may be
47 procured for the performance of split-sample analyses for performance audit
48 purposes. If such an option is selected, the alternate laboratory's quality
49 assurance plan and applicable analytical procedures will be approved before
50 use in compliance with Section 7A.4.1.2 requirements.

1 **7A.2.3 Other Support Contractors**

2
3 Support contractors could be assigned project responsibilities at the
4 direction of the Technical Lead. Such services will be in compliance with
5 standard Hanford Site procurement procedure requirements as discussed in
6 Section 7A.4.1.2. All work will be performed in compliance with approved
7 quality assurance plans and/or procedures, subject to controls of QI 7.3,
8 "Source Surveillance and Inspection" (WHC 1988b).
9

10
11 **7A.3 DATA QUALITY OBJECTIVES FOR MEASUREMENTS**

12
13 Data quality objectives for a given data collection activity describe the
14 overall level of uncertainty that decision makers are prepared to accept in
15 the analytical results deriving from the activity. Data quality requirements
16 generally are defined in terms of specific objectives for precision, accuracy,
17 representativeness, comparability, and completeness. Objectives for soil
18 sampling at the Ash Pit Demolition Site is described in this section.
19 Analytes of interest, proposed analytical methods, analytical support levels,
20 and target practical quantitation limit values are listed in Tables 7A-1 and
21 7A-2.
22

23 Precision typically is calculated either as a range (R) (for duplicate
24 measurements) or a standard deviation (σ). Precision also can be expressed as
25 a relative range (RR) (for duplicates) or a relative standard deviation (RSD).
26 When the precision for a method is not constant over the concentration range
27 of interest, the reported range or standard deviation will describe the
28 concentration dependence. The dependence alternatively could be described in
29 terms of a slope and intercept for a linear relationship, an indicated
30 function for a nonlinear relationship, or a tabulated set of precision values
31 for specific indicated concentrations.
32

33 Accuracy usually is expressed as percent recovery (P) or as percent bias
34 (P-100). When accuracy is observed to be significantly concentration
35 dependent, it could be reported in terms of a linear relationship, an
36 alternative functional relationship, or as a table of measured values.
37

38 The method detection limit is the minimum concentration of a chemical
39 constituent that can be measured reliably (i.e., it can be reported with
40 99 percent confidence that the analyte concentration is greater than zero).
41 The method detection limit is determined from a minimum of three replicate
42 analyses of samples of a given matrix type (water, soil, etc.) spiked with the
43 analyte of interest. The method detection limit is the standard deviation of
44 the replicate measurements (reported in concentration units) multiplied by the
45 appropriate Student's t value for the number of replicates taken for a one-
46 tailed test at the 99 percent level of confidence. Practical quantitation
47 limit is defined in SW-846 (EPA 1990) as the lowest concentration level that
48 can be determined reliably within specified limits of precision and accuracy
49 during routine laboratory operating conditions. Practical quantitation limit
50 values are tabulated in SW-846 for various EPA approved analytical methods for
51 evaluating solid waste. Practical quantitation limit values are matrix-
52 dependent and method-dependent. Typically, practical quantitation limits are

1 listed as multiples of the method detection limits for specified methods and
2 matrix types.

3
4 Requirements are identified in the sampling and analysis plan for
5 collection of split samples and duplicates for the purpose of evaluating the
6 precision of laboratory analyses. In the sampling and analysis plan, specific
7 quality assurance and quality control requirements are identified for each
8 individual instrument system within the onsite mobile laboratory. These
9 requirements prescribe the types and frequencies of calibration checks to be
10 performed, the minimum frequencies for analyses of splits and duplicates (for
11 evaluation of method precision) and matrix spikes and reference samples (for
12 evaluation of method accuracy). Accuracy and precision will be calculated and
13 reported as described previously.

14
15 The performance of the analytical laboratory will be subject to method-
16 and analyte-specific quantitation limits as identified in Tables 7A-1 and 7A-2
17 and minimum requirements for precision, accuracy, and completeness as follows:

- 18
19 • Precision: The range (R), or difference, for individual pairs of
20 duplicates shall be within (i.e., less than) the critical range (R_c)
21 value. The critical range is determined from the historical average
22 value of the range (\bar{R}) as follows (ASTM 1983):

$$R_c = 3.27 \bar{R}$$

23
24
25 (When this technique is employed to evaluate precision, R_c must be
26 recomputed periodically to reflect the most current value of \bar{R} .)

- 27
28 • Accuracy: Percent recoveries (P) for individual determinations of
29 spikes and standards must fall within 2 standard deviations
30 (95 percent confidence interval) of the average percent recovery (\bar{P})
31 (ASTM 1983).
32
33 • Completeness: Requirements for precision and accuracy will be met for
34 at least 80 percent of the total number of determinations on quality
35 assurance and quality control samples.
36
37

38 More stringent requirements for precision and accuracy could be specified in
39 procedures for individual laboratory methods. In that event, the more
40 stringent requirements also will apply as data quality objectives for this
41 project.

42
43 Goals for data representativeness for soil sampling are addressed
44 qualitatively by the specification of sample locations and intervals in the
45 soil sampling and analysis plan. Sample data should be comparable with other
46 measurement data for similar samples and sample conditions. Comparability
47 will be achieved qualitatively by using standard techniques to collect and
48 analyze representative samples and by reporting analytical results in
49 appropriate units.
50

1 Approved analytical procedures will require adherence to reporting
2 techniques and units that are consistent with EPA reference methods to
3 facilitate the comparability of data sets in terms of precision and accuracy.
4 Actual achieved and/or used detection limits, and values for precision,
5 accuracy, and completeness will be provided in all summary reports of
6 analyses.
7

8 Failure to conform to these criteria will be documented in data summary
9 reports as described in Section 7A.8.1, and will be evaluated in the
10 validation process discussed in Section 7A.8.2. Corrective actions will be
11 initiated by the Technical Lead as appropriate, as noted in Section 7A.13, in
12 the event that the criteria initially are not achieved.
13

14 For any soil sampling activities that are to occur at the Ash Pit
15 Demolition Site subsequent to investigative sampling, Table 7A-1 will be
16 updated to reflect current analytes of interest and data quality objectives as
17 project requirements. The listed practical quantitation limit values in Table
18 7A-1 will be used as target values in negotiations for procurement of
19 analytical laboratory services in support of these activities.
20

21 22 7A.4 PROCEDURES

23
24 The following sections discuss sampling procedures to be used and the
25 approvals and control of these procedures.
26

27 28 7A.4.1 Procedure Approvals and Controls

29
30 The following sections describe the procedures referenced to support soil
31 sampling and analysis activities.
32

33 7A.4.1.1 Hanford Site Procedures. The Hanford Site procedures that have been
34 referenced to support soil sampling and analysis activities for the Ash Pit
35 Demolition Site are listed in the quality assurance program index in the
36 *Environmental Engineering, Geotechnology, and Permitting Function Quality*
37 *Assurance Program Plan* (WHC 1990a). Referenced procedures include EIIs
38 (WHC 1988a), and quality requirements (QRs) and quality instructions (QIs)
39 (WHC 1988b). Requirements relating to approval, revision, and distribution
40 control of EIIs are addressed in EII 1.2, "Preparation and Revision of
41 Environmental Investigation Instructions"; requirements applicable to QIs and
42 QRs are addressed in QR 5.0, "Instructions, Procedures, and Drawings"; QI 5.1,
43 "Preparation of Quality Assurance Documents"; QR 6.0, "Document Control"; and
44 QI 6.1, "Quality Assurance Document Control". Other controlling documents
45 that apply to preparation, review, and revision of Hanford site analytical
46 laboratory procedures and sample management procedures are identified under
47 Criteria 5.00 and 6.00 in the *Environmental Engineering, Geotechnology, and*
48 *Permitting Function Quality Assurance Program Plan* (WHC 1990a). All of the
49 aforementioned procedures will be available on request for regulatory review.
50

51 7A.4.1.2 Participating Contractor and/or Subcontractor Procedures. As noted
52 in Section 7A.2.1, participating contractor and/or subcontractor services may

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1 be procured at the direction of the Technical Lead. All such procurements
2 will be subject to the applicable requirements of QR 4.0, "Procurement
3 Document Control"; QI 4.1, "Procurement Document Control"; QI 4.2, "External
4 Services Control"; QR 7.0, "Control of Purchased Items and Services"; QI 7.1,
5 "Preprocurement Planning and Proposal Evaluation"; and/or QI 7.2, "Supplier
6 Evaluation" (WHC 1988b). Whenever such services require procedural controls,
7 conformance to onsite procedures, or submittal of contractor procedures for
8 onsite review and approval before implementation, the requirement(s) will be
9 identified in the procurement document or work order, as applicable.
10 Analytical laboratories will be required to submit their analytical procedures
11 as well as the current version of their internal quality assurance program
12 plans for review and approval. The subject plans and procedures will be
13 reviewed and approved by operations contractor's quality assurance, sample
14 management, and analytical laboratories organization personnel, and/or other
15 qualified personnel as determined by the Technical Lead. As necessary, all
16 reviewers will be qualified per the requirements of EII 1.7, "Indoctrination,
17 Training, and Qualification" (WHC 1988a). All approved participating
18 contractor or subcontractor procedures, plans, and/or manuals will be retained
19 as project quality records in compliance with the *Document Control and Record*
20 *Management Manual*, Section 9 (WHC 1989a); QR 17.0, "Quality Assurance
21 Records"; and QI 17.1, "Quality Assurance Records Control" (WHC 1988b). All
22 such documents will be available on request for regulatory review.
23
24

25 7A.4.2 Sampling Procedures

26
27 Soil samples for analysis in the onsite mobile laboratory and for
28 confirmatory analysis by an offsite contractor laboratory will be collected in
29 compliance with EII 5.2, "Soil and Sediment Sampling" (WHC 1988a). Sample
30 numbers will be assigned as indicated in EII 5.10, "Obtaining Sample
31 Identification Numbers and Accessing HEIS Data" (WHC 1988a). Sampling
32 activities will be carried out in conformance with the sample identification,
33 container type, preparation, and preservation requirements of EII 5.11,
34 "Sample Packaging and Shipping" (WHC 1988a).
35

36 Field screening analyses for chemical constituents will be performed in
37 accordance with EII 5.9, "Soil Gas Sampling" (WHC 1988a). Additional
38 appendices to EII 5.9 (in preparation) will address operation, maintenance,
39 and calibration procedures for various individual field portable instruments.
40
41

42 7A.4.3 Procedure Additions and Changes

43
44 Additional EIIs or modifications to existing EIIs that might be required
45 as a consequence of sampling plan requirements will be developed in compliance
46 with EII 1.2, "Preparation and Revision of Environmental Investigations
47 Instructions" (WHC 1988a). Should deviations from established EIIs be
48 required to accommodate unforeseen field situations, the Field Team Leader can
49 authorize such deviations consistent with provisions and requirements in
50 EII 1.4, "Deviation from Environmental Investigations Instructions"
51 (WHC 1988a). Deviations are documented, reviewed, and dispositioned by means
52 of instruction change authorization forms, as required by EII 1.4. Other

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1 types of document change requests will be completed as required by the
2 procedures governing their preparation and revision.

5 7A.5 SAMPLE CUSTODY

7 All samples obtained during the course of this investigation will be
8 controlled from the point of origin to the analytical laboratory as stipulated
9 in EII 5.1, "Chain of Custody" (WHC 1988a). Chain-of-custody documentation
10 also will be maintained for the return of residual sample materials from the
11 laboratory. Requirements and procedures will be defined in procurement
12 documentation to subcontractor or participant contractor laboratories for the
13 return of residual sample materials after completion of analysis. Laboratory
14 chain-of-custody procedures will ensure that sample integrity and
15 identification are maintained throughout the analytical process and will be
16 reviewed and approved in advance as required by onsite procurement control
17 procedures, as noted in Section 7A.4.1.2.

19 Results of analyses will be traceable to the original samples through a
20 unique code or identifier, as specified in Section 7A.4. All analytical
21 results will be controlled as permanent project quality records as required by
22 QR 17.0, "Quality Assurance Records" (WHC 1988b) and EII 1.6, "Records
23 Management" (WHC 1988a).

25 Sample and/or data flow will be coordinated by the sample management
26 organization (Figure 7A-1). The sample management organization will be
27 responsible for tracking, controlling, and verification of in-process samples
28 and data per Section 1.0, "Sample Tracking"; Section 1.3, "Data Package
29 Control", and Section 1.1, "Data Package Verification" (WHC 1990b).

31 All soil samples will be screened in the field for beta/gamma and gross
32 alpha radioactivity in compliance with approved Hanford Site health physics
33 procedures (WHC 1988c). Samples must be released for offsite shipment by
34 health physics technicians before the samples can be transported to offsite
35 laboratories for analysis of dangerous constituents.

38 7A.6 CALIBRATION PROCEDURES

40 Calibration of all measuring and test equipment, whether in existing
41 inventory or purchased for this investigation will be controlled as required
42 by QR 12.0, "Control of Measuring and Test Equipment"; QI 12.1, "Acquisition
43 and Calibration of Portable Measuring and Test Equipment"; QI 12.2, "Measuring
44 and Test Equipment Calibration by User" (WHC 1988b); and/or applicable EIIs
45 (WHC 1988a). Routine operational checks for field equipment will be as
46 defined within applicable EIIs or other field procedures. Similar information
47 will be provided in operations contractor-approved participating contractor or
48 subcontractor procedures.

50 Calibration of Hanford Site, participating contractor, and/or
51 subcontractor laboratory analytical equipment will be performed per applicable
52 standard methods, subject to review and approval.

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1
2 **7A.7 ANALYTICAL PROCEDURES**
3

4 Specific analytical methods or procedures will be reviewed and approved
5 before use in compliance with the procedures and procurement control
6 requirements noted in Section 7A.4.1.
7

8
9 **7A.8 DATA REDUCTION, VALIDATION, AND REPORTING**
10

11 Data reduction, validation of completed laboratory data packages,
12 reporting requirements, and review and records management are discussed in the
13 following sections.
14

15
16 **7A.8.1 Data Reduction and Data Package Preparation**
17

18 On completion of each group of analyses, the analytical laboratory will
19 be responsible for preparing a report summarizing the analytical results. The
20 analytical laboratory also will prepare a detailed data package that will
21 include all information necessary to perform data validation to the extent
22 indicated by the minimum applicable requirements of Section 7A.8.2. Data
23 summary report format and data package content will be defined in procurement
24 documentation subject to review and approval as noted in Section 7A.4.1. As a
25 minimum, laboratory data packages will include the following:
26

- 27 • Sample receipt and tracking documentation (including identification of
28 the organization and individuals performing the analysis, the names
29 and signatures of the responsible analysts, sample holding time
30 requirements, references to applicable chain-of-custody procedures,
31 and the dates of sample receipt, extraction, and analysis)
32
33 • Instrument calibration documentation, including equipment type and
34 model, with continuing calibration data for the time period in which
35 the analyses were performed
36
37 • Quality control data, as appropriate for the methods used, including
38 matrix-spike/matrix-spike duplicate data, recovery percentages,
39 precision data, laboratory blank data, and identification of any
40 nonconformances that might have affected the laboratory's measurement
41 system during the time in which the analyses were performed
42
43 • The analytical results or data deliverables, including reduced data,
44 reduction formulas or algorithms, and identification of data outliers
45 and/or deficiencies.
46

47 Other supporting information, such as initial calibration data,
48 reconstructed ion chromatographs, spectrograms, traffic reports, and raw data,
49 need not be included in submittal of individual data packages unless
50 specifically requested by the Technical Lead or the sample management office.
51 All sample data, however, will be retained by the analytical laboratory and
52 made available for systems or program audit purposes upon the request of the

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1 operations contractor, DOE-RL, or regulatory agency representatives
2 (Section 7A.10.0). Such data will be retained by the analytical laboratory
3 through the duration of the contractual statement of work, at which time the
4 data will be transmitted for archiving.

5
6 A completed data package will be reviewed and approved by the analytical
7 laboratory quality assurance manager before the package is submitted to the
8 sample management organization for validation.

9
10 The requirements of this section will be included in procurement
11 documents and/or work orders, as appropriate, in compliance with the
12 procurement control procedures identified in Section 7A.4.1.

13 14 15 7A.8.2 Validation

16
17 Validation of completed laboratory data packages will be performed by the
18 sample management organization. Data validation and reporting will be
19 performed in conformance with requirements and procedures identified in *Data*
20 *Validation Procedures for Chemical Analyses* (WHC 1992).

21
22 In the case of data obtained by field screening methods, the results will
23 not be submitted in the form of data packages or sample delivery groups, and
24 data reduction and reporting will not be subject to validation.

25
26 Data validators will perform a number of tasks on each sample delivery
27 group in response to general and specific requirements identified in the data
28 validation procedures (WHC 1992). A sample delivery group is defined as a
29 group of samples (usually 20 or fewer) reported within a single laboratory
30 data package. These tasks are summarized as follows:

- 31
32 • Take delivery of the data package, stamp the receipt date on the
33 package, and make duplicate copies of the sample concentration
34 reports or report forms
- 35
36 • Organize and review the data package for completeness as described in
37 the data validation procedures Section 3.0 through Section 9.0
38 (WHC 1992) and document the completeness review on the applicable data
39 validation checklist
- 40
41 • Validate the data package and qualify sample results according to the
42 procedures and criteria described in the data validation procedures
43 Section 3.0 through Section 10.0 (WHC 1992). Data that are rejected
44 at any point during validation will be eliminated from further review
45 or consideration
- 46
47 • Check for calculation and transcription errors, applying the frequency
48 guidelines identified below
- 49
50 • Resolve any discrepancies identified during the review of the data
51 package, including any missing data, with the laboratory
- 52

- 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

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1 control samples are specified in the sampling and analysis plan for the
2 purpose of maintaining internal quality control.

- 3
- 4 • Duplicate Samples--Field duplicate samples are samples retrieved from
5 a single sampling location using the same equipment and sampling
6 technique, but analyzed independently. Laboratory duplicate samples
7 are samples taken successively from the same bulb. Duplicate samples
8 generally are used to verify the repeatability or reproducibility of
9 the analytical data.
- 10
- 11 • Split Samples--Field or field duplicate samples can be split in the
12 field and sent to an alternative laboratory as a performance audit of
13 the primary laboratory.
- 14
- 15 • Trip Blanks--A trip blank for soil sampling consists of a sample
16 container of pure silica sand that is prepared in the laboratory,
17 transported to the sampling site, and returned unopened for analysis
18 with the actual soil samples. Analysis of the trip blank will
19 eliminate false positive results for the actual samples arising from
20 contamination during shipment.
- 21
- 22 • Field Blanks--A field blank for soil sampling consists of pure silica
23 sand placed in a container identical to those used for the actual
24 samples. The field blank is transported to the site, opened at the
25 site, and submitted with the samples for analysis. A field blank is
26 used to eliminate false positives arising from contamination of
27 samples from the atmosphere at the sampling site in addition to the
28 uses cited for trip blanks.
- 29
- 30 • Equipment Blanks--An equipment blank for soil sampling consists of
31 pure silica sand that is drawn through decontaminated sampling
32 equipment and placed in a container identical to those used for the
33 actual field samples. Equipment blanks are used to verify the
34 adequacy decontamination procedures for sampling equipment in
35 addition to the uses cited for field blanks.
- 36

37 Additional quality control checks will be performed by the analytical
38 laboratories as follows.

- 39
- 40 • Matrix-Spiked and Matrix-Spiked Duplicate Samples--A known quantity
41 of a representative analyte of interest is added to an aliquot (or a
42 replicate) of an actual sample as a measure of recovery percentage.
43 Spike compound selection, quantities, and concentrations will be
44 described in the laboratory's analytical procedures.
- 45
- 46 • Quality Control Reference Samples--A quality control reference sample
47 is prepared from an independent standard at a concentration other
48 than that used for calibration, but within the calibration range.
49 Reference samples provide an independent check on analytical
50 technique and methodology.
- 51

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1 The numbers and/or frequencies of quality control samples to be
2 submitted and analyzed with each group of soil samples are specified in the
3 soil sampling and analysis plan presented in Section 7.0 of the closure plan.
4 The numbers of quality control samples proposed in the sampling plan have
5 been determined based on guidance presented in SW-846 (EPA 1990).
6

7 Other requirements specific to calibration of laboratory analytical
8 equipment are included in Section 6.0 of this plan. Detailed descriptions of
9 internal quality control requirements for participating contractor or
10 subcontractor laboratories will be provided in procurement documents or work
11 orders in compliance with standard procedures noted in Section 7A.4.1.
12

13 14 **7A.10 PERFORMANCE AND SYSTEM AUDITS**

15
16 Performance, system, and program audits will begin early in the
17 execution of this sampling plan and continue through completion of
18 activities. Collectively, the audits will address quality affecting
19 activities that include, but are not limited to, measurement accuracy;
20 intramural and extramural analytical laboratory services; field activities;
21 and data collection, processing, validation, and management.
22

23 Performance audits of the analytical accuracy of field screening
24 instrumentation will be facilitated by performing internal quality control
25 checks (i.e., testing reference and calibration standards) at regular
26 intervals specified by procedure.
27

28 Internal quality control checks also will be performed to evaluate the
29 analytical accuracy of the onsite mobile laboratory. In addition, the onsite
30 mobile laboratory will be enrolled in and periodically evaluated by the
31 Proficiency Environmental Testing program, administered by the Analytical
32 Products Group, a subsidiary of Curtin Matheson Scientific, Inc. The
33 Proficiency Environmental Testing program distributes standards (i.e., spiked
34 samples) bimonthly to participating laboratories for analysis. Standards are
35 provided for gas chromatograph analyses for volatile and semivolatile
36 organics, x-ray fluorescence metals, and ions analyzed by ion chromatography.
37 The Analytical Products Group collates and evaluates the results reported by
38 the various laboratories. Subsequently, the quality assurance officer for
39 each laboratory will receive a report of findings, including the true values
40 of constituents in the standards, the individual laboratory's percent
41 recovery, the means and standard deviations for all participating
42 laboratories, and the individual laboratory's deviation from the mean for
43 each standard. Participation in the Proficiency Environmental Testing
44 program will be the primary performance audit tool for the onsite mobile
45 screening laboratory operation.
46

47 Regarding offsite contractor laboratory analyses of confirmatory soil
48 samples, performance audits of analytical accuracy will be implemented
49 through the use of quality assurance and quality control samples.
50 Confirmatory soil samples will be split in the field. The offsite contractor
51 laboratory will receive one group of splits; the second group will be

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1 analyzed in the onsite mobile laboratory. Field and equipment blanks will be
2 included in both groups.

3
4 System audit requirements will be implemented in accordance with
5 QI 10.4, "Surveillance" (WHC 1988b). Surveillances will be performed
6 regularly throughout the course of sampling activities. Additional
7 performance and system 'surveillances' might be scheduled as a consequence of
8 corrective action requirements or might be performed on request. All quality
9 affecting activities will be subject to surveillance.

10
11 Sampling plan activities could be evaluated as part of environmental
12 restoration program-wide quality assurance audits under procedural
13 requirements (WHC 1988b). Program audits will be conducted in accordance
14 with QR 18.0, "Audits"; QI 18.1, "Audit Programming and Scheduling"; and QI
15 18.2, "Planning, Performing, Reporting, and Follow-up of Quality Audits".
16 Program audits will be performed by qualified auditors in compliance with
17 QI 2.5, "Qualification of Quality Assurance Program Audit Personnel"
18 (WHC 1988b).

19
20
21 **7A.11 PREVENTIVE MAINTENANCE**

22
23 All measurement and testing equipment used in the field and the
24 laboratory that directly affect the quality of analytical data will be
25 subject to preventive maintenance measures that ensure minimization of
26 measurement system downtime. Preventive maintenance instructions for field
27 equipment will be as stipulated in approved operating procedures for the
28 equipment. Laboratories will be responsible for performing or managing the
29 maintenance of assigned analytical equipment. Maintenance requirements,
30 spare parts lists, and preventive maintenance instructions will be included
31 in individual laboratory procedures or in laboratory quality assurance plans,
32 subject to review and approval. When samples are to be analyzed by a
33 contractor or subcontractor laboratory, preventive maintenance requirements
34 for laboratory analytical equipment will be as defined in the contractor
35 laboratory's quality assurance plan(s).

36
37
38 **7A.12 DATA ASSESSMENT**

39
40 Analytical data will be compiled and summarized by the laboratory and
41 forwarded to the sample management organization for validation as described
42 in Section 7A.8.2 before the data can be used in any assessment activities.
43 Assessments could include various statistical and probabilistic techniques to
44 compare and/or analyze data. The statistical methodologies and assumptions
45 that are to be used to evaluate data will be identified in written
46 instructions that are to be signed, dated, and retained as project quality
47 records in compliance with EII 1.6, "Records Management" (WHC 1988a) and
48 QR 17.0, "Quality Assurance Records" (WHC 1988b). These instructions will be
49 documented in the final report for each sampling and analysis project.

1 **7A.13 CORRECTIVE ACTION**
2

3 Corrective actions required as a result of surveillance reports,
4 nonconformance reports, or audit activities will be documented and
5 dispositioned as required by QR 16.0, "Corrective Action"; QI 16.1,
6 "Trending/Trend Analysis"; and QI 16.2, "Corrective Action Reporting"
7 (WHC 1988b). Primary responsibilities for corrective action resolution will
8 be assigned to the Technical Lead and the quality assurance coordinator.
9 Other needs for corrections to measurement systems, procedures, or plans that
10 are identified as a result of routine review processes will be resolved as
11 stipulated in applicable procedures or referred to the Technical Lead for
12 resolution. Copies of all surveillance, nonconformance, audit, and
13 corrective action documentation will be retained as project quality assurance
14 records.
15

16
17 **7A.14 QUALITY ASSURANCE REPORTS**
18

19 As indicated in Sections 7A.10 and 7A.13, project activities will be
20 assessed regularly by audit and surveillance processes. At the conclusion of
21 a given sampling and analysis project, all related field and laboratory data,
22 raw data, reports, surveillance reports, nonconformance reports, audit
23 reports, and corrective action documentation will be transferred for archival
24 to the Hanford Site Records Holding Area (if documentation has not been
25 transmitted previously). In the event that original quality-affecting
26 documents are to be retained and/or controlled by others, legible copies will
27 be transmitted to the Records Holding Area for inclusion in the project
28 record file.

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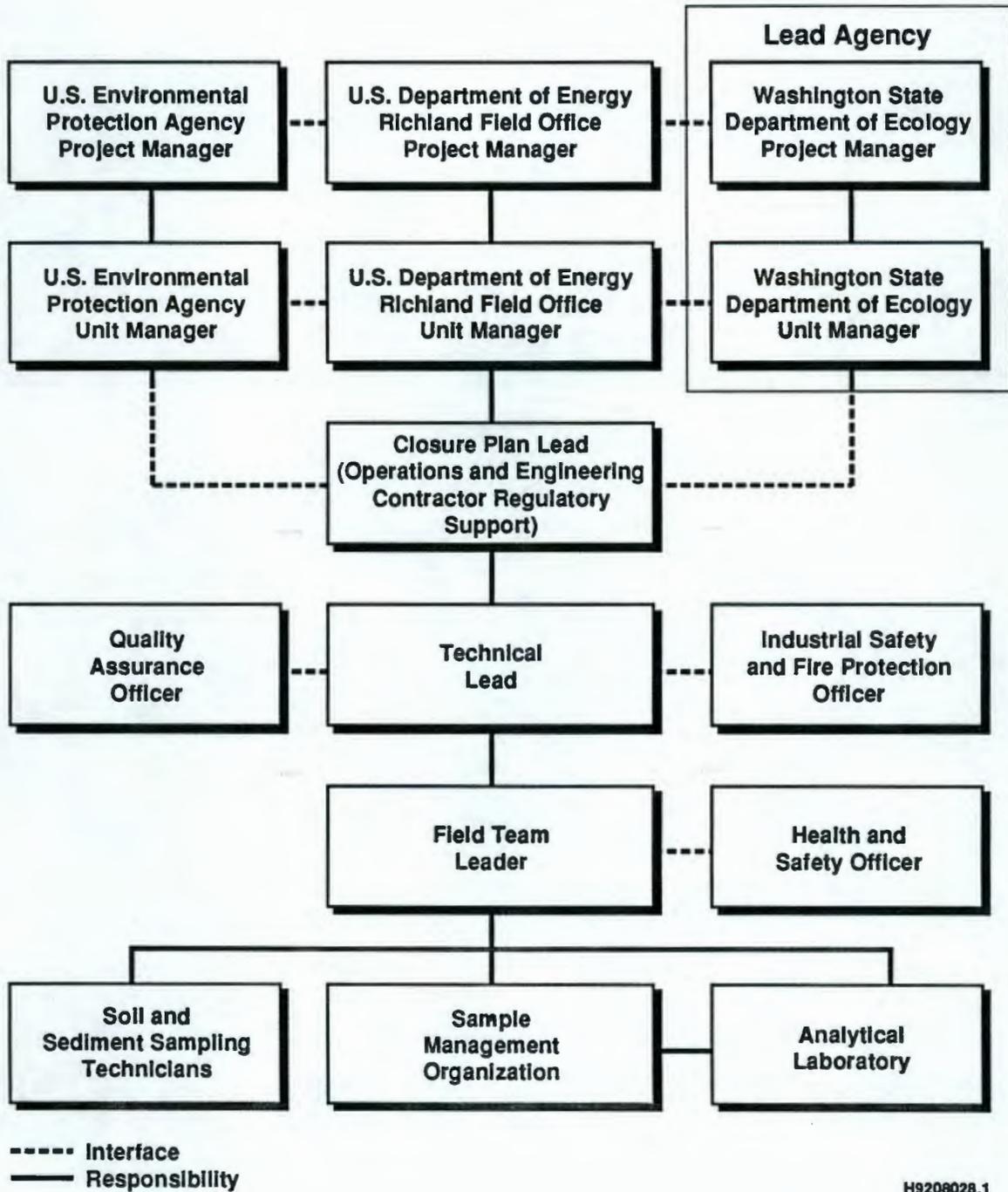


Figure 7A-1. Project Organization for Sampling and Analysis for 200 West Ash Pit Demolition Site Closure Area.

Table 7A-1. The 200 West Ash Pit Demolition Site 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):

Target Compound List (TCL) Analytes (PQL = 5 $\mu\text{g}/\text{kg}$):

- * Benzene
- * Toluene

Tentatively Identified Compound (TIC) Analytes (PQL = 100 $\mu\text{g}/\text{kg}$, except as noted):

- * Acrolein (poor purging analyte), (PQL = 1,000 $\mu\text{g}/\text{kg}$)
- * 1,2-Bis(2-chloroethoxy)ethane
- * Bromobenzene
- * 2-Butoxyethanol
- * Cyclohexane
- * Diisopropyl benzene
- * Dioxane (poor purging analyte) (PQL = 1,000 $\mu\text{g}/\text{kg}$)
- * Ethyl acetate
- * Ethyl ether
- * Heptane
- * Hexane
- * Isopropyl ether
- * Naphtha (petroleum naphtha)
- * Nitromethane
- * Tetrahydrofuran
- * Tetrahydronaphthalene

Analysis for Semivolatile Organics by Supercritical Fluid Extraction followed by GC/MS (Analytical Level III):

Tentatively Identified Compound (TIC) Analytes (PQL = 3,300 $\mu\text{g}/\text{kg}$):

- * Phenyl ether
- * Picryl chloride

Aqueous Extraction Followed by Direct Aqueous Injection (Analytical Level III, PQL = 100 mg/kg):

- * Allyl alcohol (degradation product of allyl magnesium bromide)
- * n-Butyl alcohol (degradation product of butyllithium)
- * Ethylene glycol monoethyl ether
- * Methanol
- * p-Nitrobenzoic acid (degradation product of p-Nitrobenzoyl chloride)
- * Picric acid

Analysis for Metals by X-Ray Fluorescence (Analytical Level III, PQL = 10 mg/kg):

- * Chromium metal, powdered

Ions by Ion Chromatography (Analytical Level III, PQL = 100 mg/L):

- * Chloride
- * Sulfate
- * Sulfide

Auxiliary 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.
 $\mu\text{g}/\text{kg}$ = microgram per kilogram.
mg/kg = milligram per kilogram.
mg/L = milligram per liter.
N/A = not applicable.

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APPENDIX 7B

TRAINING COURSE DESCRIPTIONS

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APPENDIX 7B

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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)													Total hours	
	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**
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).

¹Scott 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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