



Environmental Assessment

Closure of Nonradioactive Dangerous Waste Landfill (NRDWL) & Solid Waste Landfill (SWL), Hanford Site, Richland, Washington

U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

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Summary

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Introduction. This Environmental Assessment (EA) provides information and analyses of proposed U.S. Department of Energy (DOE) activities associated with closure of the DOE Hanford Site's Nonradioactive Dangerous Waste Landfill (NRDWL) and the Solid Waste Landfill (SWL).

Purpose and Need. The DOE needs to close the non-operating NRDWL. This facility has not received waste since 1988 (i.e., a non-operating facility), and would be closed according to *Resource Conservation and Recovery Act of 1976* (RCRA) requirements as implemented through the *Hazardous Waste Management Act* and *Washington State Dangerous Waste Regulations* (WAC 173-303). To achieve maximum efficiency, the adjacent SWL would also be closed; the SWL has been inoperative since 1996.

The availability of *American Recovery and Reinvestment Act of 2009* (ARRA) funding for landfill closure activities associated with NRDWL and SWL has provided DOE with an opportunity to identify actions that could be accelerated and accomplished earlier than previously planned. Some additional funding may be used to complete activities beyond Fiscal Year 2011.

Proposed Action. DOE proposes to close the non-operating NRDWL and SWL. Proposed closure activities previously have been addressed in DOE/RL-90-17 (Revision 1), *Nonradioactive Dangerous Waste Landfill Closure/Postclosure Plan*, and DOE/RL-2008-54 (Draft A), *Hanford Site Solid Waste Landfill Closure Plan*.

The aforementioned closure plans have been submitted to the State of Washington Department of Ecology (Ecology) in their capacity as the regulatory agency overseeing WAC 173-303, "Dangerous Waste Regulations," and WAC 173-350, "minimum Functional Standards for Solid Waste Handling." Closure activities would focus on final cover installation including oversight of the unit during cover installation and appropriate certifications. An evapotranspiration (ET) cover is planned for the NRDWL and SWL. The ET cover would consist of a fine-grained, low permeability soil and a top layer of the same fine-grained soil modified with 15 percent by weight pea-gravel to form an erosion resistant top soil that will sustain native vegetation.

Borrow material for the cover would be obtained from the Hanford Site's Borrow Area C. DOE previously entered into a Memorandum-of-Agreement (MOA) between DOE, the Washington State Department of Archaeology and Historic Preservation, and the Advisory Council on Historic Preservation for Area C (concurring parties are the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, and the Wanapum). The MOA is being amended to address the specific needs associated with closure of NRDWL and SWL.

Postclosure activities would begin after installation of the final cover and Ecology acceptance of closure. Postclosure activities would include long-term monitoring activities (including installation of wells), periodic inspections, and maintenance activities to ensure the long-term integrity of the closed landfill. Groundwater monitoring would continue during the postclosure period consistent with a compliant groundwater monitoring program. Additional activities would be identified in the approved closure plans.

Part of the funding for the proposed action would be through ARRA; additional funding source(s) to complete activities occurring beyond FY 2011 would be identified as necessary.

The proposed action analyzed in this EA are within the scope of DOE/EIS-0391, *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (TC&WM EIS). As such, the proposed action is an 'interim action;' DOE will prepare and complete this

1 interim action EA before the TC&WM EIS process is complete to take advantage of ARRA funding
2 opportunities and accelerate cleanup.

3 **Affected Environment.** The Hanford Site lies within the semiarid Pasco Basin of the Columbia Plateau
4 in south-central Washington State. The Site, spanning approximately 50 km (30 mi) north to south and
5 40 km (24 mi) east to west, occupies an area of about 1,517 km² (586 mi²) north of the confluence of the
6 Yakima River with the Columbia River. The Hanford Site has restricted public access, providing a buffer
7 for areas currently used for storage of nuclear materials, waste treatment, and waste storage and/or
8 disposal.

9 The Columbia River flows through the northern part of the Hanford Site, before turning south to form
10 part of the Site's eastern boundary. The Yakima River, which joins the Columbia River at the city of
11 Richland, runs near the southern boundary of the Hanford Site. Rattlesnake Mountain, Yakima Ridge, and
12 Umtanum Ridge form the southwestern and western boundaries, and Saddle Mountain forms the northern
13 boundary. Two small east-west ridges, Gable Butte and Gable Mountain, rise above the plateau of the
14 central part of the Hanford Site. Adjoining lands to the west, north, and east are principally range and
15 agricultural land. The cities of Kennewick, Pasco, and Richland (the Tri-Cities), West Richland, and
16 Benton City constitute the nearest population centers and are located south-southeast and southwest of the
17 Hanford Site.

18 The U.S. Army Corps of Engineers began construction of the Hanford Site in 1943 to produce plutonium
19 for national defense; it was the first nuclear production facility in the world. The region was selected
20 because of its remoteness and because it had abundant electrical power from Grand Coulee Dam, a
21 functional railroad, clean water from the Columbia River, and available sand and gravel for construction.

22 During recent ecological surveys, no federal- or state-threatened or endangered species, species proposed
23 for listing, or critical habitats were observed in any of the areas potentially affected by the proposed
24 action.

25 Cultural and historical resources have been identified within some portions of the areas affected by the
26 proposed action, and appropriate measures for their management have been established.

27 According to the 2000 Census, the population residing within 80 km (50 mi) of the Hanford Site was
28 about 349,000, and the region contained some concentrations of minority and low-income populations.
29 No prime farmland, scarce geological resources, or floodplains are within the proposed area of potential
30 effect.

31 **Environmental Impacts of Proposed Action.** Environmental impacts associated with closure activities
32 are expected to be small. Resources required for closure consist of available materials and fuels, and the
33 labor required represents a small fraction of the local market.

34 Worker and offsite radiological dose consequences, and chemical exposure from closure activities, are
35 expected to be small.

36 The proposed landfill closure activities would further disturb the areas associated with NRDWL and
37 SWL, which are largely sites that have been previously disturbed. Activities in these areas, therefore,
38 present an opportunity for disruption of ecological resources that have become established since
39 operations ceased. The potential for discovery of cultural and historic sites that were previously
40 unrecognized is small.

41 The proposed sites currently are not known to contain sensitive ecological resources or critical habitats
42 that would be affected by the proposed activities. Restoration of previously disturbed areas would have a

1 beneficial effect on ecological resources and habitats. Management of known cultural and historic
2 resources, as well as any discovered during closure activities, would be in accordance with regulatory
3 requirements and agreements among DOE and other responsible agencies or parties. The MOA for use of
4 borrow material from Area C on the Hanford Site is being amended to address the specific needs
5 associated with closure of NRDWL and SWL.

6 Health and safety risks to workers and members of the public from landfill closure activities are projected
7 to be small, and no different than those normally present at other Hanford cleanup sites. The proposed
8 activities might have short-term impacts on local traffic and noise levels, and temporary impacts on air
9 quality could also occur. However, because of the remoteness of these activities from occupied areas, they
10 would be unlikely to exceed regulatory standards for noise levels or air concentrations of criteria
11 pollutants and particulates. Effluents and wastes generated during closure activities would be minimized
12 to the extent practicable and would be managed using existing Hanford Site facilities.

13 Postclosure impacts are expected to be minimal, consisting of occasional site access for monitoring. The
14 workforce would remain at about current levels, resulting in little, if any, incremental impact on
15 community infrastructure, socioeconomic, or transportation resources. Because the impacts from
16 operations are projected to be small in all cases, there would be no opportunity for both high and
17 disproportionate adverse impacts on minority or low-income populations, nor would noticeable
18 cumulative impacts with other ongoing operations in the region be expected.

19 **Mitigation of Environmental Impacts.** Mitigation of environmental impacts associated with closure
20 activities would take place as required by existing regulations, agreements, and policies, including the
21 aforementioned amended MOA for Area C. Restoration of disturbed areas would return them to a more
22 natural state, and cultural and historic resources would be managed in consultation with regulatory
23 agencies and Tribal Nations. Health and safety risks would be managed under existing Hanford Site
24 policies and procedures with implementation of special measures as necessary to reduce worker risks.

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Acronyms and Abbreviations

1		
2	ACHP	Advisory Council on Historic Preservation
3	APE	Area of Potential Effect
4	ARRA	<i>American Recovery and Reinvestment Act of 2009</i>
5	bls	below landfill surface
6	BRMiS	DOE/RL-96-88, <i>Hanford Site Biological Resources Mitigation Strategy</i>
7	BRMP	DOE/RL-96-32, <i>Hanford Site Biological Resources Management Plan</i>
8	CCP EIS	<i>Hanford Reach National Monument Comprehensive Conservation Plan and</i>
9		<i>Environmental Impact Statement</i>
10	CEQ	Council on Environmental Quality
11	CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act</i>
12	CFR	Code of Federal Regulations
13	DART	Days Away (from work), Restricted, or Transferred
14	DOE	U.S. Department of Energy
15	EA	Environmental Assessment
16	EIS	Environmental Impact Statement
17	EPA	U.S. Environmental Protection Agency
18	ERDF	Environmental Restoration Disposal Facility
19	ET	evapotranspiration
20	FONSI	Finding of No Significant Impact
21	FR	Federal Register
22	HCP EIS	<i>Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement</i>
23	HCRMP	DOE/RL-98-10, <i>Hanford Cultural Resources Management Plan</i>
24	MOA	Memorandum of Agreement
25	NEPA	<i>National Environmental Policy Act of 1969</i>
26	NHPA	<i>National Historic Preservation Act</i>
27	NRDWL	Nonradioactive Dangerous Waste Landfill
28	OSHA	U.S. Occupational Safety and Health Administration
29	PNNL	Pacific Northwest National Laboratory
30	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
31	RCW	Revised Code of Washington
32	RL	U.S. Department of Energy, Richland Operations Office
33	ROD	Record of Decision
34	RTD	Removal, Transport, and Disposal
35	SHPO	State Historic Preservation Office(r)
36	SWL	Solid Waste Landfill
37	TC&WM EIS	<i>Draft Tank Closure and Waste Management Environmental Impact Statement</i>

1	TPA	<i>Hanford Federal Facility Agreement and Consent Order</i> or Tri-Party Agreement
2	TRC	Total Recordable Case(s)
3	Tri-Cities	Kennewick, Pasco, and Richland
4	USC	United States Code
5	USFWS	U.S. Fish and Wildlife Service
6	WAC	Washington Administrative Code
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Glossary

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Hazardous chemical. Any chemical that is a physical or health hazard.

Hazardous waste. Waste that contains chemically hazardous constituents regulated under Subtitle C of the *Resource Conservation and Recovery Act (RCRA)*, as amended (40 CFR 261) and regulated as a hazardous waste and/or mixed waste by the U.S. Environmental Protection Agency (EPA).

Health hazard. Any material for which there is statistically significant evidence that acute or chronic health effects may occur in exposed individuals. Such materials include:

- carcinogens
- mutagens
- teratogens
- toxic or acutely toxic agents
- reproductive or developmental toxins
- irritants
- corrosives
- sensitizers
- liver, kidney, and nervous system toxins
- agents that act on the blood-forming systems
- agents that damage the lungs, skin, eyes, or mucous membranes.

Low-level (radioactive) waste. Radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e[2] of the *Atomic Energy Act of 1954*, as amended), or naturally occurring radioactive material.

Mixed low-level waste. Low-level waste determined to contain both source, special nuclear, or byproduct material subject to the *Atomic Energy Act of 1954*, as amended, and a hazardous component subject to the RCRA, as amended, or provisions of the Hazardous Waste Management Act, Chapter 70.105, Revised Code of Washington (RCW), and the regulations promulgated thereunder in Chapter 173-303 Washington Administrative Code (WAC).

Physical hazard. Any chemical for which there is scientifically valid evidence that it is a:

- flammable or combustible liquid
- compressed gas
- explosive
- flammable solid
- oxidizer
- peroxide
- pyrophoric
- unstable (reactive) or water-reactive substance.

Pollution Prevention. The use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and waste into land, water, and air. For the Department of Energy, this includes recycling activities.

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1 Introduction; Purpose and Need for Agency Action

2 This Environmental Assessment (EA) provides information and analysis of proposed U.S. Department of
3 Energy (DOE) activities to close the DOE Hanford Site's Nonradioactive Dangerous Waste Landfill
4 (NRDWL) and the Solid Waste Landfill (SWL). Information contained in this EA will be used by DOE to
5 determine if the proposed action is a major federal action significantly affecting the quality of the human
6 environment. If the proposed action is determined to be a major action with potentially significant
7 environmental impacts, an Environmental Impact Statement (EIS) would be required. If the proposed
8 action is not determined to be a major action that could result in significant environmental impacts, a
9 Finding of No Significant Impact (FONSI) would be issued, and the action may proceed. This EA is
10 prepared in compliance with the *National Environmental Policy Act of 1969* (NEPA); the *Council on*
11 *Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA*; and the DOE
12 *National Environmental Policy Act Implementing Procedures*.

13 Purpose and Need for Agency Action

14 DOE needs to close the non-operating NRDWL. This facility has not received waste since 1988 (i.e., a
15 non-operating facility), and would be closed according to *Resource Conservation and Recovery Act of*
16 *1976* (RCRA) requirements as implemented through the Hazardous Waste Management Act,
17 Chapter 70.105, Revised Code of Washington (RCW), and the regulations promulgated thereunder in
18 Chapter 173-303 Washington Administrative Code (WAC). To achieve maximum efficiency, the
19 adjacent SWL would also be closed; the SWL has been inoperative since 1996.

20 The availability of *American Recovery and Reinvestment Act of 2009* (ARRA) funding for closure
21 activities associated with NRDWL and SWL has provided DOE with an opportunity to identify actions
22 that could be accelerated and accomplished earlier than previously planned. Some additional funding may
23 be used to complete activities beyond Fiscal Year 2011.

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2 Background¹

The proposed activities described in this EA would take place on the Hanford Site, as shown in Figures 2-1 and 2-2, and described in Section 4. Historically, parts of this area were privately owned and were used for agricultural purposes, ranching, and some natural gas exploration. Landowners were evicted in 1943 when the area was incorporated into the Hanford Site, which was established as part of the Manhattan Project during World War II. Initially, the area served as a safety and security buffer zone for Manhattan Project activities and contained facilities designed to defend Hanford Site operations from possible attack during and after the war. Following the war, the area was used for various environmental research purposes, some of which continue to the present.

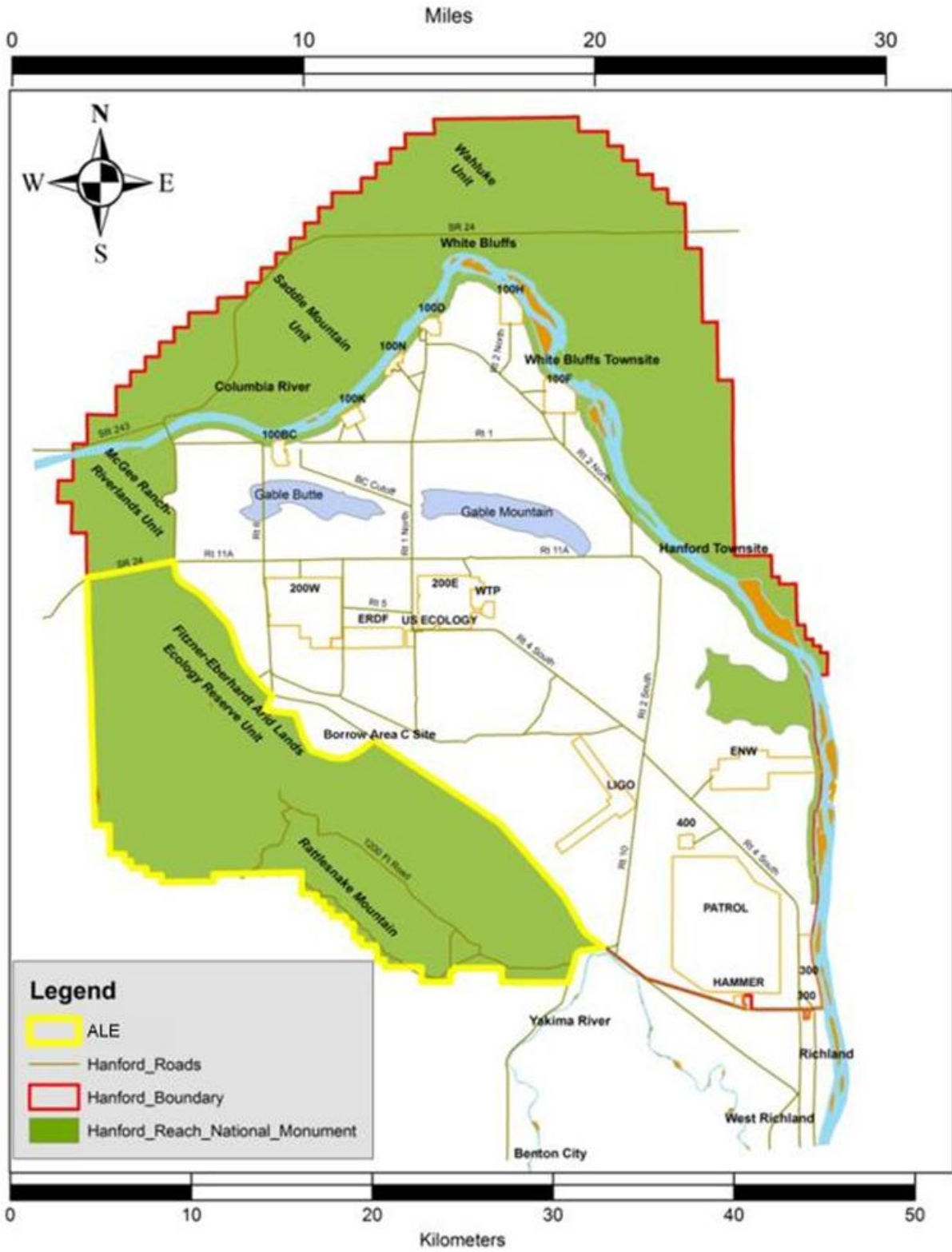
2.1 Nonradioactive Dangerous Waste Landfill (NRDWL)

NRDWL is an inactive non-operating landfill. Although a NRDWL site closure plan was written in 1990 (DOE/RL-90-17, *Nonradioactive Dangerous Waste Landfill Closure/Postclosure Plan*), the closure plan has not been approved. The landfill provided a site for disposal of dangerous waste generated from process operations, research and development laboratory maintenance activities, and transportation functions throughout Hanford. The NRDWL is located about 5.6 kilometers (2.5 miles) southeast of the 200-East Area on Army Loop Road, southwest of the Route 4 intersection and southeast of the 200-East Area. It began operation in 1975 and occupies an area of approximately 4.5 hectares (10 acres). It consists of 19 parallel trenches, each about 122 meters (400 feet) long, 4.9 meters (18 feet) wide at the base, and 4.6 meters (15 feet) deep. A triangular column of undisturbed soil with approximately 1:1 side slopes separated the trenches as they were constructed. The final profile of the trench varied depending on the type of waste received. The trenches typically were backfilled and covered with 2 to 3 meters (6 to 10 feet) of soil at the end of each operating day. Beginning in 1975, chemical waste was disposed of in six trenches, asbestos in nine trenches, and nonhazardous solid waste in one trench; three were unused. The last receipt of dangerous waste was in May 1985; the last receipt of asbestos occurred in May 1988 (DOE/RL-2004-60).

The NRDWL, centrally located within the 600 Area of the Hanford Site, is a non-operating landfill that would be closed according to RCRA requirements as implemented through WAC 173-303. The NRDWL received nonradioactive dangerous waste from 1975 through 1985. In addition to dangerous waste, the NRDWL also received asbestos waste material through 1988 and sanitary solid waste in one trench that operated during 1976. A RCRA Part B permit application was submitted November 1985; an initial RCRA Part A permit application for NRDWL was submitted to EPA in November 1989 (including other treatment, storage, and disposal units) with the most recent Part A revision (Revision 7) dated October 2008.

Since it ceased operations, the landfill has been monitored for groundwater contamination. Groundwater monitoring at the NRDWL is performed in accordance with a unit-specific monitoring plan and is coordinated with the overall Hanford Site groundwater-monitoring project. Results for groundwater monitoring parameters are at or near background for most constituents. Limited soil gas monitoring has been completed at the NRDWL during the 1990s. A RCRA closure plan is being prepared to address RCRA closure of the facility and will be submitted to the State of Washington Department of Ecology (Ecology) for approval.

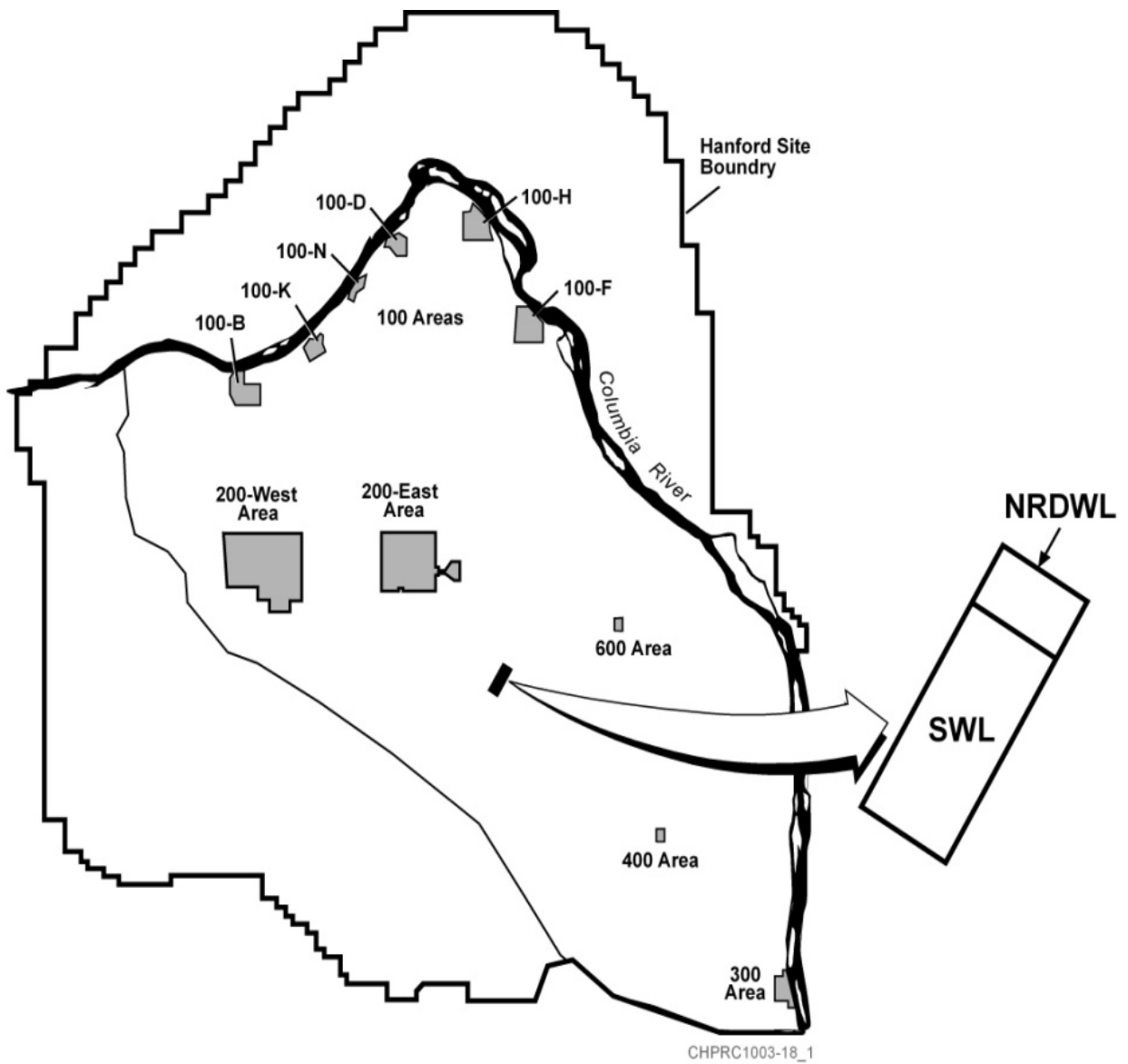
¹ The two landfills (NRDWL and the SWL) were operated as a single landfill that was originally known as the Central Landfill. Because of the presence of dangerous waste in the chemical trenches, the 19 northernmost trenches were designated as the NRDWL under the Hanford Facility RCRA Permit. The southern two-thirds of the area were later designated as the 600 Central Landfill (or SWL) which is a treatment, storage, and disposal unit (DOE/RL-90-17).



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Figure 2-1. Hanford Site

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Figure 2-2. Location of NRDWL and SWL

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1 The chemical inventory of NRDWL has been identified in DOE/EIS-0391, *Draft Tank Closure and Waste*
 2 *Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC&WM*
 3 *EIS)* (Page S-160; Tables S-84a and -84b). Such chemicals, as shown below in Table 1, include arsenic,
 4 cadmium, carbon tetrachloride, and chromium. This inventory was considered in evaluating cumulative
 5 impacts in the TC&WM EIS, and is addressed herein in Section 5.9.
 6

Table 1. Chemical Inventory in NRDWL

Chemical	Inventory (kilograms)
1,2-Dichloroethane	3.00
1,4-Dioxane	79.5
1-Butanol	13.5
2,4,6-Trichlorophenol	-
Acetonitrile	4.50
Arsenic	0.27
Benzene	356
Boron and Compound	651
Cadmium	448
Carbon tetrachloride	94
Chromium	26.4
Dichloromethane	21
Fluoride	76.2
Hydrazine/Hydrazine Sulfate	315
Lead	10.4
Manganese	6.1
Mercury	136
Molybdenum	1.9
Nickel	2,240
Nitrate	10.600
Polychlorinated Biphenyls	-
Silver	0.13
Strontium (stable)	0.04
Trichloroethylene	631
Total Uranium	-
Vinyl Chloride	-

Note: Dash (-) means no data found or inventory is estimated to be 0 or below detectable levels.

1 2.2 Solid Waste Landfill

2 The SWL (also known historically as the 600 Central Landfill) is a non-RCRA solid waste landfill
 3 adjacent to NRDWL on the south side. It is a larger facility (27 hectares [67 acres]) that received
 4 nondangerous and nonradioactive solid (i.e., principally solid waste, including paper, construction debris,
 5 asbestos, and lunchroom waste.) from 1973 through March 1996. It also received up to 5,000,000 liters
 6 (1,320,000 gallons) of sewage and 380,000 liters (100,000 gallons) of garage wash water. The liquid
 7 waste was discharged to east-west oriented trenches at the perimeter of the main solid-waste area, along
 8 the northeast and northwest boundaries of the SWL.

9 The SWL is a non-operating landfill that was planned to be closed according to the requirements of
 10 WAC 173-350, "Minimum Functional Standards for Solid Waste Handling." Ecology has determined
 11 (Ecology 2010) that the same closure/final cover, post-closure care, groundwater monitoring, and other
 12 applicable requirements developed for NRDWL will apply to SWL as a corrective action pursuant to
 13 WAC 173-303-64620. The requirements of WAC 173-350 will be satisfied through the deferral option in
 14 WAC 173-350-710(8). Ecology will waive the solid waste permitting requirement by deferring to the
 15 Hanford Facility Dangerous Waste Permit that will include corrective action requirements pursuant to
 16 WAC 173-303-64620.

17 In 1996, all SWL operations ceased and the waste trenches were covered with soil. Since it ceased
 18 operations, the landfill has been monitored for both groundwater contamination and gas releases.
 19 Groundwater monitoring at the SWL has been performed in accordance with a site-specific monitoring
 20 plan² and is coordinated with the overall Hanford Site groundwater-monitoring project. Results for
 21 groundwater monitoring parameters have been at or near background. Also, results of past and recent soil
 22 gas monitoring indicate that soil gas release from the SWL has stabilized. Concentrations of methane and
 23 other key volatile organic compounds of concern are at or below detection limits, and well below the
 24 lower flammability limit. The close proximity of SWL to NRDWL allows for closure of both facilities
 25 simultaneously, taking advantage of cost efficiency.

26 The chemical inventory in SWL did not meet the threshold criteria in the TC&WM EIS for "sites having
 27 inventories with a potential to contribute significantly to cumulative impacts" (refer to Appendix S of the
 28 TC&WM EIS). Therefore, potential cumulative impacts associated with the proposed action would be
 29 attributed to NRDWL (refer to Section 2.2 for a discussion of NRDWL; and Section 5.9 for potential
 30 cumulative impacts).

31 2.3 Separate but Related Actions

32 2.3.1 Cultural Program Activities

33 Section 106 of the *National Historic Preservation Act* (NHPA) requires taking into account the effect of
 34 federal undertakings on historical properties and objects before taking action. The definition of
 35 undertaking in 36 CFR 800.16 is very broad, including federally funded or permitted projects, activities,
 36 and programs. DOE/RL-98-10, *Hanford Cultural Resources Management Plan* (HCRMP) focuses on two
 37 major categories of activities at Hanford potentially affecting cultural resources: disturbing soil (digging,
 38 drilling, moving, etc) and disturbing (demolishing, decontaminating, etc.) historical buildings. DOE
 39 implements NHPA requirements in coordination with the State historic Preservation Officer and Tribal
 40 Nations in the vicinity of the Hanford Site.

² There is trend of increasing calcium and magnesium concentration in the groundwater. The concentration has essentially doubled in the past twenty years; however, the concentrations are being monitored and neither of these constituents are not primary or secondary drinking water standards.

1 **2.3.2 *Resource Conservation and Recovery Act Decisions***

2 Wastes that contain hazardous constituents are regulated under RCRA requirements as implemented
3 through RCW 70.105 and the regulations promulgated thereunder in WAC 173-303. Closure plans
4 prepared consistent with these requirements are subject to approval by Ecology.

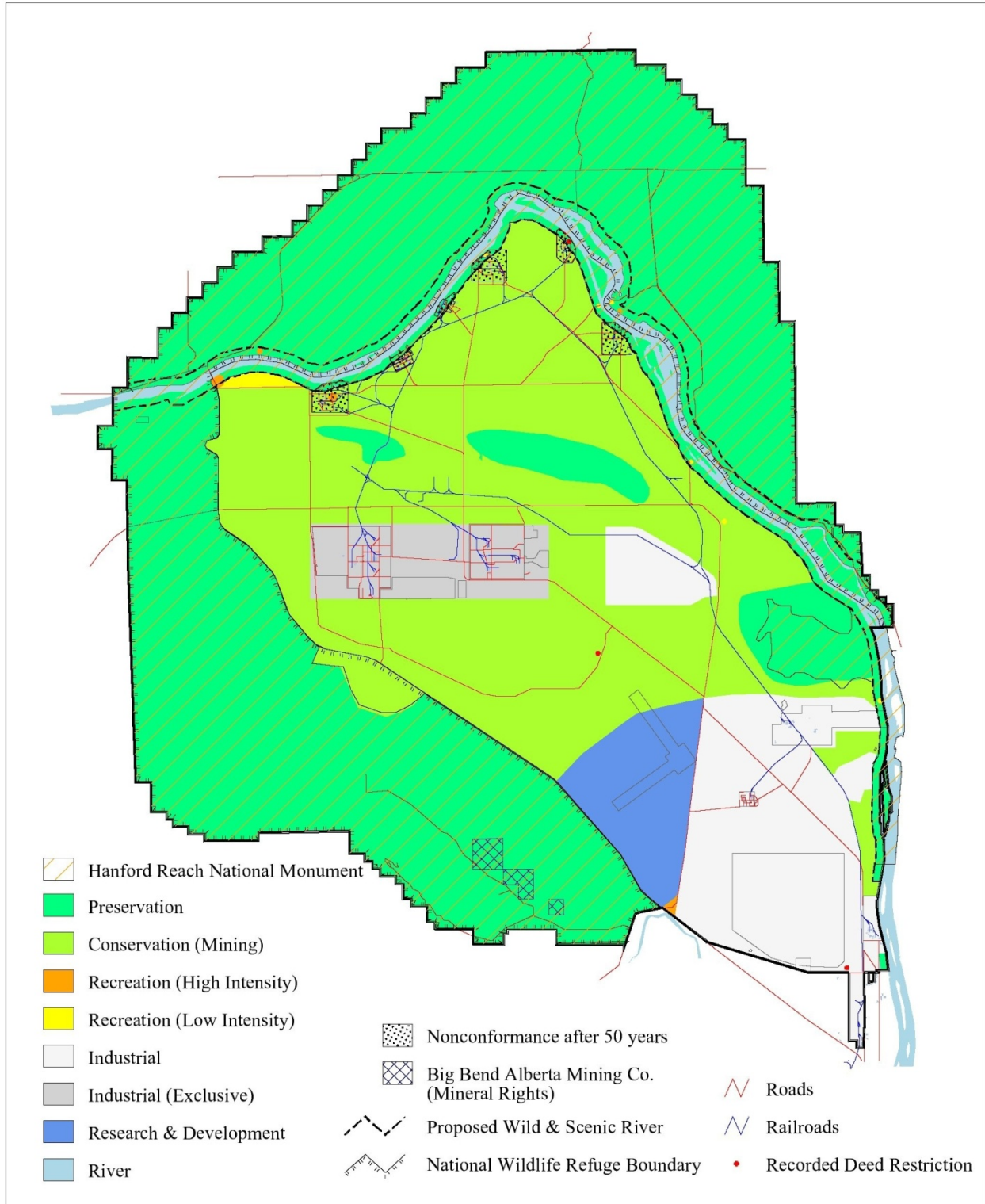
5 **2.3.3 *Comprehensive Environmental Response, Compensation, and Liability Act Decisions***

6 The *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989)
7 outlines the approach that DOE will take for permitting and closure of the Hanford RCRA regulated
8 treatment, storage, and disposal units. These two landfills are included in a draft remedial
9 investigation/feasibility study work plan completed in September 2007 (DOE/RL-2004-60). The remedial
10 investigation/feasibility study process, or closure in accordance with applicable RCW 70.105 and
11 WAC 173-303 regulations, will be used to reach a decision that will meet requirements for both National
12 Priorities List cleanup and RCRA corrective action (DOE/RL-2004-60).

13 **2.3.4 Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement**

14 The purpose of DOE/EIS-0222F, *Final Hanford Comprehensive Land-Use Plan Environmental Impact*
15 *Statement* (HCP EIS) was to facilitate decision-making about the Hanford Site's uses and facilities.
16 DOE's decision attempted to balance its continuing land-use needs at Hanford with its desire to preserve
17 important ecological and cultural values of the site and allow potential economic development in some
18 areas. The designated land use for the area where the proposed activities that are the subject of this EA
19 would take place (i.e., NRDWL/SWL closure and Borrow Area C) is designated as conservation
20 (Mining). Figure 2-3 shows the final land use designations established in the 1999 DOE Record of
21 Decision (ROD) for the Hanford Site based on the final HCP EIS (64 FR 61615).

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Figure 2-3. Land Use on the Hanford Site including Hanford Reach National Monument

1 In the HCP EIS, the land use designations were defined as follows:

- 2 • **Industrial-Exclusive:** An area suitable and desirable for treatment, storage, and disposal of
3 hazardous, dangerous, radioactive, and nonradioactive wastes. Includes related activities consistent
4 with Industrial-Exclusive uses.
- 5 • **Industrial:** An area suitable and desirable for activities, such as reactor operations, rail, barge
6 transport facilities, mining, manufacturing, food processing, assembly, warehouse, and distribution
7 operations. Includes related activities consistent with Industrial uses.
- 8 • **Preservation:** An area managed for the preservation of archeological, cultural, ecological, and natural
9 resources. No new consumptive uses (i.e., mining or extraction of nonrenewable resources) would be
10 allowed within this area. Limited public access would be consistent with resource preservation.
11 Includes activities related to Preservation uses.
- 12 • **Conservation (Mining):** An area reserved for the management and protection of archeological,
13 cultural, ecological, and natural resources. Limited and managed mining (e.g., quarrying for sand,
14 gravel, basalt, and topsoil for governmental purposes) could occur as a special use (e.g., a permit
15 would be required) within appropriate areas. Limited public access would be consistent with resource
16 conservation. Includes activities related to Conservation (Mining), consistent with the protection of
17 archeological, cultural, ecological, and natural resources.

18 A Supplement Analysis (DOE/EIS-0222-SA-01, *Supplement Analysis. Hanford Comprehensive Land-*
19 *Use Plan Environmental Impact Statement*) and an amended ROD issued in 2008 (73 FR 55824)
20 supported the conclusions and clarified the decisions published in the 1999 ROD. The actions evaluated
21 in this EA would propose no changes to the existing land uses established in the HCP EIS.

22 2.3.5 Hanford Reach National Monument Comprehensive Conservation Plan and Environmental 23 Impact Statement

24 The *Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact*
25 *Statement* (USFWS 2008) (CCP EIS) establishes USFWS goals and objectives for management of the
26 Hanford Reach National Monument for the next 15 years. DOE participated in the preparation of the
27 CCP EIS as a cooperating agency. The subsequent CCP to be issued by the USFWS is intended to
28 provide the framework for conserving natural, cultural, and recreational resources; managing visitor use;
29 developing facilities; and addressing day-to-day operations of the Monument.

30 The ROD, signed on September 25, 2008, selected the USFWS-preferred alternative, which provided for
31 protection and conservation of ecological, geological, paleontological, and cultural resources by creating
32 extensive areas that are free of facility development (73 FR 72519). Restoration was a top priority, with
33 some areas open to public use. New facilities and public access points would be consolidated to minimize
34 impacts to the Monument and to provide economies of scale in management and maintenance. Vehicle
35 access into the interior of the Monument would be limited primarily to routes that are currently available;
36 however, much of the Monument would be open to nonmotorized access.

37 2.3.6 The Tank Closure and Waste Management Environmental Impact Statement

38 The TC&WM EIS has been prepared to address proposed actions relating to closure of single-shell tanks,
39 current and expanded waste management activities, and the decommissioning of the Fast Flux Test
40 Facility (71 FR 5655). It also provides a comprehensive analysis of the cumulative impacts of other
41 activities taking place or planned at the Hanford Site, including remediation activities. It considers the
42 potential for removing unneeded facilities on the Hanford Site, some of which are included within the
43 scope of activities described in this EA. The EIS also includes analysis of potential impacts on cultural,

1 historical, paleontological, and visual resources, as well as Native American interests; and it presents a
2 discussion of potential mitigation actions that could be taken to reduce or minimize impacts associated
3 with the proposed actions and alternatives. In parallel with the TC&WM EIS, DOE has initiated the
4 NHPA Section 106 process, based on a determination that the TC&WM EIS proposed actions would
5 likely result in adverse effects as defined under that law. An initial draft Memorandum of Agreement
6 (MOA) has been exchanged with the State Historic Preservation Officer (SHPO), Advisory Council on
7 Historic Preservation (ACHP), and local area tribes. DOE plans to continue consultations on this draft
8 MOA after considering the comments received on the draft EIS. A primary outcome of this process would
9 be the development of appropriate stipulations to protect and further minimize the potential adverse
10 effects to historic properties listed, or eligible for listing, on the National Register of Historic Places as a
11 result of implementing any actions evaluated in the EIS.

12 DOE has prepared this interim action EA to facilitate completing the proposed actions in a timely manner,
13 taking advantage of the unique funding opportunity provided by the ARRA. Consistent with the
14 requirements of Council on Environmental Quality (CEQ) regulations (40 CFR 1506.1(c)), DOE does not
15 anticipate that the proposed closure activities would prejudice its decision or limit its ability to select from
16 among the proposed actions being evaluated in the TC&WM EIS concerning closure of the single-shell
17 tanks; supplemental technologies to augment the high-level waste treatment process at the Waste
18 Treatment Plant; continuing or expanding waste management capabilities; and determining an appropriate
19 end state for the Fast Flux Test Facility.

20 The TC&WM EIS would address the potential mitigation actions that may be appropriate in order to
21 implement the DOE-selected preferred alternative(s). Some of these mitigation actions may also benefit
22 the areas within the scope of this EA. The final TC&WM EIS and the final MOA under NHPA
23 Section 106 would be based on DOE's consideration of all the Tribal Nation input and public comments
24 that it receives. Any ROD issued based on the final TC&WM EIS analyses provides DOE with the
25 opportunity to address any further mitigation concerns that may be associated with implementing the
26 preferred alternative(s) or the closure activities proposed in this EA.

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3 Description of the Proposed Action and Alternatives

This section describes DOE's proposed action and alternatives to the proposed action, including the No-Action Alternative. It should be noted that closure plans described for the proposed action are based on conceptual plans. The final designs, plans, and schedules as ultimately approved for implementation may differ somewhat from those discussed in this EA. However, the nature, scope, and environmental impacts of the proposed action described here are expected to substantially reflect and adequately encompass those associated with actual project implementation.

3.1 Proposed Action

DOE proposes to close the non-operating NRDWL and SWL. Proposed closure activities have been addressed in DOE/RL-90-17 and DOE/RL-2008-54.

The aforementioned closure plans have been submitted to Ecology in their capacity as the regulatory agency overseeing WAC 173-303, and WAC 173-350, "Solid waste handling standards."³ Closure activities would focus on final cover installation including oversight of the unit during cover installation and appropriate certifications. An evapotranspiration (ET) cover is planned for the NRDWL and SWL (Figure 3-1). The ET cover would consist of a fine-grained, low permeability soil and a top layer of the same fine-grained soil modified with 15 percent by weight pea-gravel to form an erosion resistant top soil that will sustain native vegetation. This cover is equivalent to a RCRA Subtitle C cover system.

The fine-grained soil borrow material for the ET cover would be obtained from the DOE Hanford Site's Borrow Area C. DOE previously entered into an MOA between DOE, the Washington State Department of Archaeology and Historic Preservation, and the Advisory Council on Historic Preservation for up to approximately 11 acres at Borrow Area C (concurring parties are the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, and the Wanapum). The MOA is being amended to address the specific needs associated with closure of NRDWL and SWL. The final proposed amended MOA, *Amended Memorandum of Agreement for Use of the Borrow Source at Area C, Hanford Site, Richland, Washington, Between the U.S. Department of Energy and the Washington State Historic Preservation Office with the Participation of Consulting Parties: Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Wanapum*, is included in Appendix A.

Supplemental pea gravel for the side slopes could be obtained from an existing onsite borrow area or from an off-site commercial source. A candidate onsite borrow location is Pit #6, located west of the 300 Area (in the 600 Area of the Hanford Site) (Figure 2-1). Approximately 12,000 CY of 4-inch minus pit run gravel would need to be extracted from Pit #6. This would require the expansion of Pit #6 to approximately half an acre (and 15 ft. deep).

³ The SWL is a non-operating landfill that was planned to be closed according to the requirements of WAC 173-350, "Minimum Functional Standards for Solid Waste Handling." Ecology has determined (Ecology 2010) that the same closure/final cover, post-closure care, groundwater monitoring, and other applicable requirements developed for NRDWL will apply to SWL as a corrective action pursuant to WAC 173-303-64620. The requirements of WAC 173-350 will be satisfied through the deferral option in WAC 173-350-710(8). Ecology will waive the solid waste permitting requirement by deferring to the Hanford Facility Dangerous Waste Permit that will include corrective action requirements pursuant to WAC 173-303-64620.

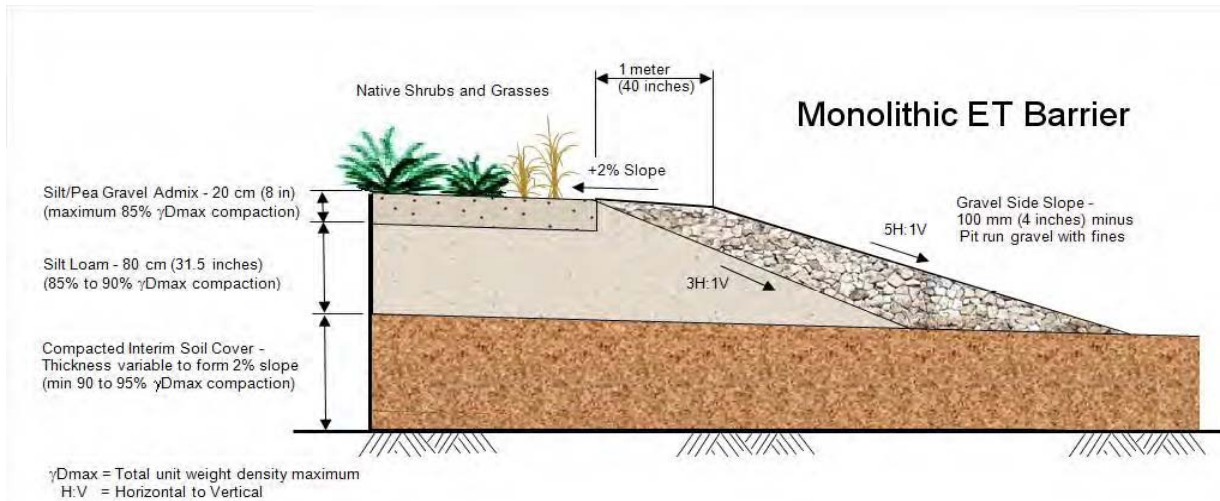


Figure 3-1. Typical Cross section of Evapotranspiration Cover (or monolithic ET barrier)

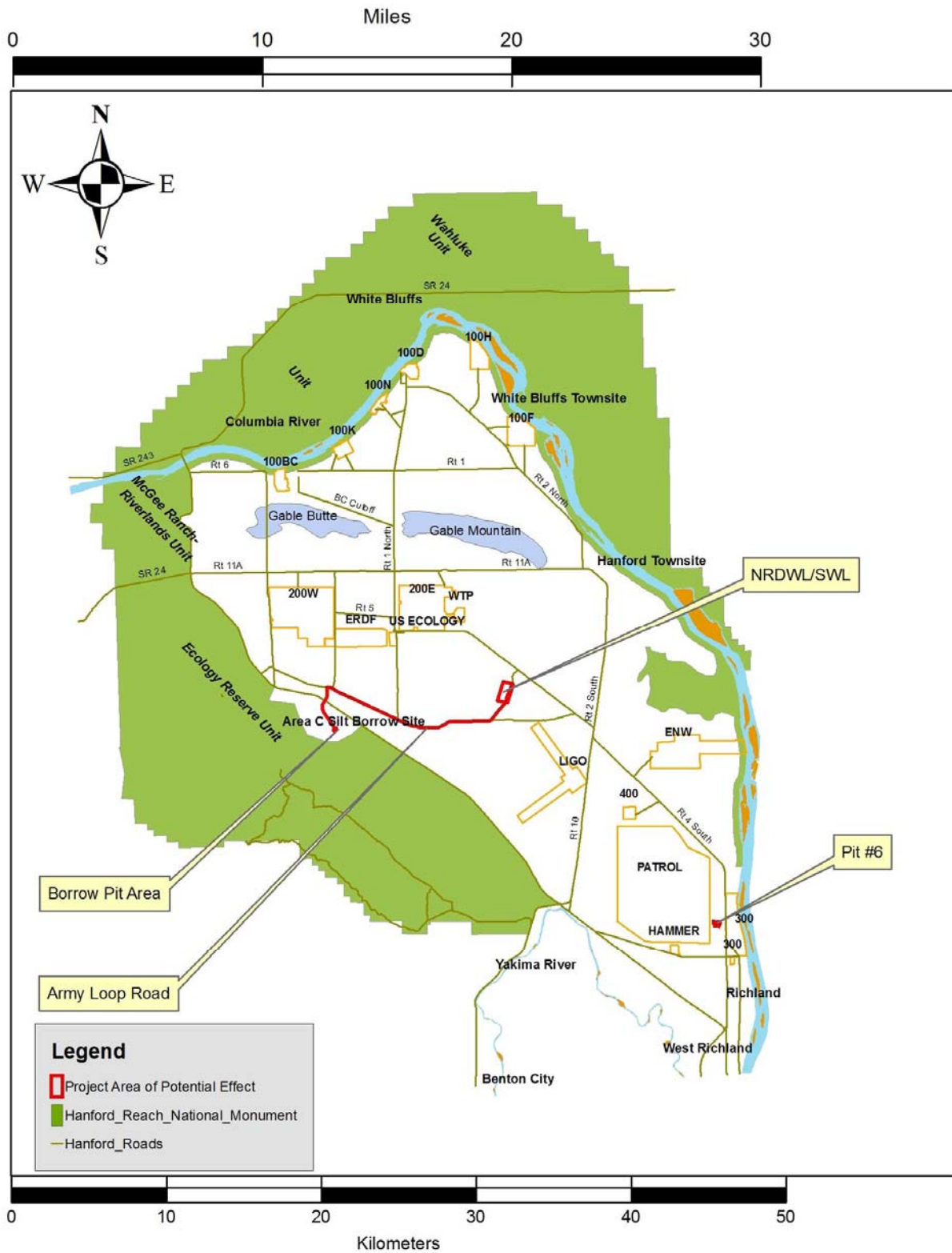
Additional ancillary activities have been identified in the closure plans. These activities include relocation/installation of monitoring equipment and wells.

Ancillary activities at NRDWL and SWL would support installation of the ET cover. Activities would include site preparation (e.g., clearing and grading), removal of existing foundations, and installation/removal of fencing. Temporary support zone areas would be established outside the cover footprint to house the construction field offices and general site operations. Support zone areas would provide for equipment lay down, worker parking, equipment storage/parking, temporary stockpiles and other construction related activities. Local site equipment access roads would be needed during different project phases to allow for ingress/egress into the cover footprint areas and allow access for construction and final grading along the edges of the final cover.

Existing monitoring wells and soil gas monitoring points now located within the cover footprint would either be secured or decommissioned and closed; new wells would be installed as appropriate in accordance with final closure plan requirements. An existing pan lysimeter located belowground in the south-central area of SWL that is used to measure infiltration would be modified to accommodate future monitoring.

Additionally, infrastructure upgrades would be provided as part of the proposed action. Upgrades to Army Loop Road would be necessary to facilitate transport of borrow material (Figure 3-2). Originally this road was constructed at a width of 20 feet but currently only about 18 feet is passable (due to age deterioration and vegetation encroachment). To provide for safe bi-directional hauling traffic, current planning provides that a portion of the road would be cleared 2 feet to its original 20ft and expanded by 4 feet (for a total of 24 feet wide). Additionally, upgrades to portions of the existing roadway would be needed. Road improvements will be accomplished through gravel surfacing and as such would require regular applications of dust suppressant and grading. Once the NRDWL/SWL cover is complete, road maintenance would cease.

Postclosure activities would begin after installation of the final cover and Ecology acceptance of closure. Postclosure activities would include long-term monitoring activities, periodic inspections, and maintenance activities to ensure the long-term integrity of the closed landfill.



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2 Figure 3-2. Location of Project Areas in Relation to the Hanford Site, Richland, Washington.
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1 Groundwater monitoring would continue during the postclosure period consistent with a compliant
2 groundwater monitoring program. Additional activities would be identified in the approved closure plans.

3 Although NRDWL and SWL currently have operational covers (course-textured material ranging from
4 2 to 10 feet thick) these covers were never designed to keep water out and limit percolation into the
5 underlying waste. Consequently, nonradiological contaminants have migrated to the groundwater.
6 Groundwater monitoring has indicated that contaminant concentrations (already well below levels of
7 concern) are decreasing with time. With the proposed construction of an ET barrier over both landfills,
8 33 years of onsite data (as well as modeling) indicate that very little (less than 2 mm/year) water would
9 infiltrate through the ET barrier and percolate down into the waste to form hazardous leachate, which
10 could then subsequently migrate through the vadose zone to the groundwater. In addition to being
11 protective of groundwater, construction of this barrier would mitigate the biological pathway from the
12 surface (e.g., plant roots).

13 3.1.1 Pollution Prevention and Waste Minimization

14 Consistent with the requirements and guidance of regulations and executive orders, including the
15 *Pollution Prevention Act of 1990*, DOE incorporates pollution prevention and waste minimization
16 practices in construction activities. Pollution prevention is defined as the use of materials, processes, and
17 practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous
18 substances, and wastes into land, water, and air. Pollution prevention includes practices that reduce the
19 use of hazardous materials, energy, water, and other resources along with practices that protect natural
20 resources through conservation or more efficient use. Within DOE, pollution prevention includes all
21 aspects of source reduction as defined by EPA and incorporates waste minimization by expanding beyond
22 the EPA definition of pollution prevention to include recycling. Pollution prevention is applied to all
23 DOE pollution-generating activities, including facility construction and demolition activities.

24 Pollution prevention would be achieved through:

- 25 • Equipment or technology selection or modification, process or procedure modification, reformulation
26 or redesign of products, substitution of raw material, and waste segregation
- 27 • Efficiency in the use of raw materials, energy, water, or other resources
- 28 • Recycling to reduce the amount of waste materials and pollutants destined for release, treatment,
29 storage, and disposal.

30 3.1.2 Emergency Preparedness

31 DOE Order 151.1C, *Comprehensive Emergency Management System*, provides the framework for
32 development, coordination, control, and directions of all emergency planning, preparedness, readiness
33 assurance, response, and recovery actions. DOE staff members participate in regularly scheduled
34 exercises to train emergency personnel who would respond to potential accidents and other events.
35 Emergency services on Hanford lands are provided by the Hanford Patrol, the Benton County Sheriff, and
36 the Hanford Fire Department.

37 3.2 Alternatives Considered

38 3.2.1 Partial Removal, Transport and Disposal (RTD)

39 Partial RTD alternative consists of removal of all waste material from both landfills and impacted soils up
40 to 10 feet below the waste material. This represents a total of 30 feet below landfill surface (bls). This
41 represents a volume of approximately 3.5 million cubic yards. The waste material is located in trenches as
42 both bulk, wrapped and drummed /containerized material. This material would be removed by common

1 industrial waste excavation methods (and re-packaging as needed). It is estimated to consist of ½ the total
2 excavation volume. Removal of inter-trench soils (soil excavation) would be by conventional
3 contaminated soil removal methods. All waste removal activities would require extensive environmental
4 monitoring and oversight. It is estimated that approximately 2.5 million cubic yards would be
5 contaminated and would be disposed of at the Hanford Site's Environmental Restoration Disposal Facility
6 (ERDF); approximately 1 million cubic yards (of the original 3.5 million cubic yards removed) could be
7 returned into the excavation. Replacement soil (approximately 2.5 million cubic yards could be obtained
8 from existing onsite borrow source(s), or potential future ERDF expansion (i.e., soil removed during an
9 approved ERDF expansion). The replacement fill would be placed in the excavation, compacted and filled
10 to grade; final grade would be restored with native seed source.

11 3.2.2 Complete RTD (excavation to groundwater)

12 The Complete RTD Alternative would consist of removal of all waste material from the landfills and all
13 potential impacted vadose zone soils to groundwater (total 120 ft bls). Removal would be conducted in
14 stages. The top 30 ft would be removed as in Partial RTD, then a deep excavation completed to
15 groundwater (approx 120 ft bls). This represents a total volume of approximately 24 million cubic yards.
16 Excavation depth could be achieved by a combination of methods, including open pit mining, sheet pile,
17 benching, etc.

18 All waste and soil from directly below the landfills would be disposed of at ERDF. Approximately
19 15 million cubic yards are expected to be disposed of at ERDF. The remainder (approximately 9 million
20 cubic yards) would be stockpiled and returned to the excavation as fill. Additional soil needed for mining
21 zone stability and fill (approximately 15 million cubic yards) also would be stockpiled (obtained from
22 existing onsite borrow source or and assumed ERDF expansion). Material would be placed in the
23 excavation, compacted/filled to grade, then the site restored with native seed source.

24 3.3 No-Action Alternative

25 Under the No-Action Alternative, the non-operating NRDWL and SWL would remain in place with little
26 ongoing maintenance. The No Action Alternative does not meet DOE's purpose and need to close
27 NRDWL and SWL as described in closure plans submitted to Ecology for approval.

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4 Affected Environment

Aspects of Hanford lands and their environs that might be affected by the proposed action are described in this section. In accordance with DOE’s “sliding scale” guidance (DOE 2004), the description of the affected environment in this section emphasizes the resource areas and considerations most likely to be affected by the proposed action and highlights information that is necessary to assess or understand the potential environmental impacts. Additional details specific to the Hanford Site environment may be found in *Hanford Site National Environmental Policy Act (NEPA) Characterization* (PNNL-6415) and Chapter 3 (“Affected Environment”) of the TC&WM EIS.

4.1 Land Use

As noted in Section 2.3.2, land use for the locations which are the subject of this EA was designated as Conservation (Mining) in the 1999 DOE ROD for the HCP EIS (64 FR 61615). A Supplement Analysis (DOE/EIS-0222-SA-01) and an amended ROD issued in 2008 (73 FR 55824) supported the conclusions and clarified the decisions published in the 1999 ROD.

4.2 Cultural and Historical Resources

The Hanford Site contains an extensive record of human occupation documenting a series of overlapping cultural landscapes stretching back thousands of years, each layer of which tells the story of how people have used the landscape. Three distinct landscapes are defined—the Native American Cultural Landscape, the Early Settlers and Farming Landscape, and the Manhattan Project and Cold War Era Cultural Landscape. A detailed description of how each of these landscapes is generally represented is derived from the NEPA Characterization Report (PNNL-6415) and from the HCRMP.

A cultural resources review (HCRC# 2010-600-018) has been prepared to address the closure of NRDWL and SWL. An Area of Potential Effect (APE) has been prepared and submitted to the SHPO. The APE addressed not only NRDWL/SWL, but also Borrow Area C (borrow area for the silt-loam for the proposed cover), the existing Hanford Site borrow area designated as Pit #6, and Army Loop Road. Additionally, an existing MOA is being amended to address borrow source material from Borrow Area C (Appendix A).

4.3 Ecological Resources

The Hanford Site contains an array of plant and animal species with a variety of habitat. NRDWL and SWL are highly disturbed portions of the 600 Area of the Hanford Site; very little native vegetation is found in the immediate vicinity of these facilities. Borrow Area C burned during the 24 Command fire in 2000; the predominant vegetation canopy cover in this area is cheatgrass.

An ecological resources review (ECR #2010-600-018) has been prepared to address the closure of NRDWL and SWL. The state and federally listed threatened and endangered plant and animal species of potential interest were identified by examining published state and federal resource listings. Priority habitats and flora and fauna species of concern are identified by Washington Department of Fish and Wildlife (2008a, 2008b) and Washington State Department of Natural Resources (2009). Lists of animal and plant species considered endangered, threatened, proposed, or candidate by the USFWS are maintained at 50 CFR 17.11 and 50 CFR 17.12; the list of birds protected under the *Migratory Bird Treaty Act* is maintained at 50 CFR 10.13.

Additional details specific to the Hanford Site environment may be found in PNNL-6415 and Chapter 3 (“Affected Environment”) of the TC&WM EIS.

1 4.4 Transportation

2 The regional highway network in the vicinity of the Hanford Site consists of several main routes: a
 3 DOE-maintained road network within the Hanford Site State Route 240, and State Route 24. At peak
 4 periods, commuter traffic is often heavy on all primary routes to and from the Hanford Site, including
 5 State Routes 240 and 24. The Washington State Department of Transportation recently widened State
 6 Route 240 between the cities of Richland and Kennewick and revised traffic flow to relieve congestion.
 7 A paved access road for Borrow Area C was constructed in 2006.

8 4.5 Human Health and Safety

9 The DOE records occupational injuries and illnesses in two primary categories pertinent to DOE NEPA
 10 analysis:

- 11 • Total recordable cases (TRC) are the total number of work-related injuries or illnesses that resulted in
 12 death, days away from work, job transfer or restriction, or "other recordable case" as identified in the
 13 Occupational Safety and Health Administration (OSHA) Form 300, Log of Work-Related Injury and
 14 Illness (OSHA 2007).
- 15 • Lost workday cases represent the number of cases recorded resulting in days away from work or days
 16 of restricted work activity (DART), or both.

17 TRC rates for U.S. Department of Energy, Richland Operations Office (RL) averaged 1.1 cases per
 18 200,000 worker hours during the period from 2003 through 2008, and DART rates averaged 0.5 per
 19 200,000 worker hours. Comparable average rates over the same period for all DOE offices and
 20 contractors were 1.6 TRC and 0.7 DART cases per 200,000 worker hours. Rates for construction
 21 activities at DOE facilities were slightly higher during the same period, at 1.8 and 0.7 cases per 200,000
 22 worker hours, respectively (DOE/EA-1660F). For comparison, rates for U.S. industry during 2003–2007
 23 were 4.6 TRC and 2.4 DART cases per 200,000 worker hours (BLS 2008).

24 4.6 Waste Management

25 As a part of the proposed action, existing permitted waste disposal facilities would be used for
 26 nonhazardous closure debris and potentially hazardous waste. It is expected that the majority of the waste
 27 would be transported to ERDF at Hanford. ERDF is composed of double-lined cells and can be expanded
 28 as necessary to accommodate wastes from environmental remediation activities at the Hanford Site. The
 29 facility can accept hazardous waste, low-level radioactive waste, and mixed low-level waste (containing
 30 both radioactive and hazardous constituents) that meets the facility's waste acceptance criteria.

31 4.7 Visual Resources

32 Hanford Site lies in the Pasco Basin of the Columbia Plateau northwest of the city of Richland, where the
 33 Yakima and Columbia Rivers join. The land in the vicinity of Hanford ranges from generally flat to
 34 gently rolling (the land in the vicinity of the NRDWL and SWL is generally flat). Rattlesnake Mountain,
 35 rising to 1,060 meters (3,480 feet) above mean sea level, forms the southwestern boundary of the site.
 36 Gable Mountain and Gable Butte are the highest landforms within the site, rising to a height of
 37 329 meters (1,081 feet) and 238 meters (782 feet), respectively. The Columbia River flows through the
 38 northern part of the site, and turning south forms part of the eastern site boundary. White Bluffs, steep
 39 whitish-brown bluffs adjacent to the river, are a striking feature of the landscape Hanford facilities can be
 40 seen from elevated locations such as Gable Mountain, Gable Butte, Rattlesnake Mountain, and other parts
 41 of the Rattlesnake Hills along the western perimeter. Site facilities also are visible from State Routes 240

1 and 24 and the Columbia River. Because of terrain features, distances involved, the size of Hanford Site,
 2 and the size of individual structures, not all facilities are visible from the highways or the Columbia River
 3 (refer to Section 3.2.1.2 of the TC&WM EIS)

4 4.8 Other Resource Areas

5 In accordance with DOE's NEPA guidance on development of the Affected Environment section and
 6 applying the "sliding scale" approach in this guidance (DOE 2004), DOE has determined that the
 7 following resource areas are not as likely to be affected by the proposed action and are therefore
 8 presented in less detail.

9 4.8.1 Air Quality

10 Air quality within the region is generally good with occasional exceptions caused by blowing dust.
 11 Atmospheric dispersion is relatively good with infrequent periods of stagnation occurring mostly during
 12 winter months. Air quality within Benton County has been designated as being in attainment with all EPA
 13 and State of Washington nonradiological air quality standards. Additional details regarding Hanford Site
 14 air quality is provided in Section 3.2.4 of the TC&WM EIS.

15 4.8.2 Geology and Soils

16 Hanford lies within the Columbia Basin, which comprises the northern part of the Columbia Plateau
 17 physiographic province and the Columbia River flood-basalt geologic province (PNNL-6415). Thus, the
 18 extent of the Columbia Basin is generally defined as that area underlain by the Columbia River Basalt
 19 Group. Within this region, Hanford lies within the Pasco Basin, a structural and topographic depression of
 20 generally lower-relief plains and anticlinal ridges. Elevations across the central portion of the basin and
 21 Hanford range from about 119 meters (390 feet) above mean sea level at the Columbia River to
 22 229 meters (750 feet) above mean sea level across the 200 Areas. The Pasco Basin is bounded on the
 23 north by the Saddle Mountains; on the west by Hog Ranch–Naneum Ridge and the eastern extension of
 24 Umtanum and Yakima Ridges; on the south by Rattlesnake Mountain and the Rattlesnake Hills; and on
 25 the east by the Palouse Slope. Two east-west trending ridges, Gable Butte and Gable Mountain, lie in the
 26 central portion of Hanford between the 100 and 200 Areas. These features reflect the eastern extension of
 27 Umtanum Ridge into Hanford.

28 Most of the geologic features visible in the Columbia Basin occurred during the last 18 million years
 29 when layers of molten lava began flooding across the Northwest, creating what is now one of the largest
 30 continental volcanic provinces. Cataclysmic floods millions of years later cut through the basalt layers.
 31 Rattlesnake Mountain is basaltic bedrock that has faulted and been folded in a narrow, asymmetrical
 32 anticlinal ridge.

33 Fifteen different soil types occur at Hanford. These soils vary from sand to silty and sandy loam. The
 34 dominant soil types are Quincy (Rupert) sand, Burbank loamy sand, Ephrata sandy loam, and Warden silt
 35 loam (PNNL-6415). No soils at Hanford are currently classified as prime farmland soils because there are
 36 no current soil surveys, and the only prime farmland soils in the region are irrigated.

37 4.8.3 Noise

38 Because of the distance from general public roads and access, man-made noise is rarely intrusive at the
 39 Hanford Site.

40 4.8.4 Floodplains and Wetlands

41 The NRSWL and SWL do not lie within a floodplain. No perennial surface-water features, including
 42 streams and ponds, have been documented within the boundaries of Borrow Area C. However, portions of

1 the area lie within the probable maximum flood zone associated with Cold Creek. This ephemeral stream
 2 may only contain water after large precipitation or snowmelt events before the water rapidly infiltrates
 3 into the subsurface

4 There are no wetlands located in the vicinity of NRDWL, SWL, or Borrow Area C.

5 4.8.5 Socioeconomics and Environmental Justice

6 Activities on the Hanford Site play a substantial role in the socioeconomics of the Tri-Cities. DOE and its
 7 contractors comprise the largest single source of employment in the Tri-Cities. Fiscal year (FY) 2006
 8 year-end employment for all DOE contractors was 9,707. In addition to these totals, Bechtel National,
 9 Inc., which is responsible for the design, building, and start up of the Waste Treatment Plant, employed
 10 1,647 staff at the end of FY 2006. Based on employee records as of April 2007, over 90 percent of DOE
 11 contractor employees live in Benton and Franklin counties (PNNL-6415).

12 An estimated 160,600 people lived in Benton County and 64,200 lived in Franklin County during 2006,
 13 totaling 224,800, an increase of over 17 percent from the Census 2000 figure. During 2006, Benton and
 14 Franklin counties accounted for 3.5 percent of Washington's population (PNNL-6415).

15 Population estimates and percentages by race and Hispanic origin for Benton, Franklin, Grant, Adams,
 16 and Yakima counties and within the 80-km (50-mile) radius of the Hanford Site from the 2000 Census
 17 indicate Asians and individuals of Hispanic origin from Benton and Franklin counties represent lower and
 18 higher proportions of the population, respectively, than in the State of Washington as a whole
 19 (PNNL-6415). Additional information, including a detailed breakdown of minority and low-income
 20 populations in the vicinity, can be found in PNNL-14428, *Hanford Area 2000 Population*.

21 Under Executive Order 12898, DOE is responsible for identifying and addressing disproportionately high
 22 and adverse impacts on minority and low-income populations. Minority persons are those who identify
 23 themselves as Hispanic or Latino, Asian, Black or African American, American Indian or Alaska Native,
 24 Native Hawaiian or Other Pacific Islander, or multiracial (with at least one race designated as a minority
 25 race under CEQ guidelines) (refer to TC&WM EIS, Appendix J). CEQ recognizes that many minority
 26 and low-income populations derive part of their sustenance from subsistence hunting, fishing, and
 27 gathering activities (sometimes for species unlike those consumed by the majority population) or depend
 28 on water supplies or other resources that are atypical or are used at different rates than they are by other
 29 groups. These differential patterns of resource use are to be identified where practical and appropriate.

30 American Indians of various tribal affiliations live in the greater Columbia Basin, and several rely at least
 31 partly on natural resources for subsistence. For example, there is some dependence on natural resources
 32 for dietary subsistence by some members of the Confederated Tribes of the Umatilla Indian Reservation,
 33 the Nez Perce Tribe, and the Confederated Tribes and Bands of the Yakama Nation. The Wanapum also
 34 are historical residents of the Hanford Site. Although not signatory to any treaty with the United States
 35 and therefore not a federally recognized Tribe; the Wanapum and their interests in the area have been
 36 acknowledged. American Indian tribes have historically lived on what is now Hanford and continue to
 37 live adjacent to the site. They fish on the Columbia River and gather food resources near Hanford. Some
 38 tribes are also recognized to have cultural and religious ties to the site.

39 4.8.6 Greenhouse Gases

40 Executive Order 13423, 'Strengthening Federal Environmental, Energy, and Transportation Management'
 41 (January 29, 2007; 72 FR 3919) calls for Federal agencies to improve energy efficiency and reduce
 42 greenhouse gas emissions of the agency, through reduction of energy intensity by (i) 3 percent annually
 43 through the end of FY 2015, or (ii) 30 percent by the end of FY 2015, relative to the baseline of the

1 agency's energy use in FY 2003. On October 5, 2009, Executive Order 13514 was signed, establishing an
2 integrated strategy towards sustainability in the Federal government and making reduction of greenhouse
3 gas emissions a priority for agencies.

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5 Impacts of Proposed Action and Alternatives

The environmental consequences described in this section would result principally from closure of NRDWL and SWL. Potential impacts in the environs of Hanford as a result of implementing the proposed action, Partial RTD or Complete RTD alternatives, or the No-Action Alternative are described in the following sections.

5.1 Land Use

Property associated with NRDWL and SWL, and Borrow Area C was designated as Conservation (Mining) in the 1999 DOE ROD for the HCP EIS (64 FR 61615). The proposed actions and alternatives in this EA would be consistent with the protection of archeological, cultural, ecological, and natural resources.

Use of borrow material from Borrow Area C for construction of the ET cover is being addressed in the amended MOA (Appendix A). Therein, approximately 450,000 cubic yards of fine-grained soil would be removed, and transported to NRDWL and SWL. Specific stipulations are included setting forth DOE's agreement concerning actions that will be taken to minimize or avoid adverse effects associated with the additional development and transportation of borrow materials from Borrow Area C

Existing borrow sites or ERDF expansion soils could be used for fill to support Partial RTD or Complete RTD (Section 3.2.1 and 3.2.2, respectively). Further, land disturbance beyond the existing footprint of NRDWL/SWL would be expected to occur as a result of stockpile and deep excavation mining stability requirements.

5.2 Cultural and Historical Resources

The APE includes four main areas of interest: 1) the NRDWL/SWL area, 2) the area targeted for silt-loam borrow soil (Area C), 3) Pit #6, and 4) Army Loop Road. In accordance with 36 CFR 800, the Washington State Historic Preservation Office, Yakama Nation, Nez Perce Tribe, Wanapum, Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Colville Reservation were notified of the APE on March 8, 2010. A cultural resources field inventory of all unsurveyed portions of the project APE was completed between March 16 and March 24, 2010. The inventory included documenting the Army Loop Road on a Historic Property Inventory form and updating two previously recorded anti-aircraft artillery sites (45BN1052 and HT-92-030) eligible for the National Register of Historic Places.

The National Register of Historic Places evaluation of Army Loop Road determined that Army Loop Road is not eligible as a contributing property to the Manhattan Project/Cold War Era Historic District. Project activities will result in an adverse effect to this property because they will cause direct impacts to the property. By documenting Army Loop Road on a Historic Property Inventory form, all mitigation has been completed in accordance with DOE/RL-97-56, *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan*. Archaeological sites 45BN1052 and HT-94-030 will not be adversely affected by project activities because they will be avoided.

Borrow Area C is located within the National Register of Historic Places-eligible traditional cultural property known by Native American Tribes as *Laliik*, portions of which are on the Hanford Site. DOE, in consultation and cooperation with other agencies, has prepared the final proposed amended MOA (Appendix A). Therein, DOE has determined that excavation activities at Borrow Area C will result in an adverse effect to National Register-eligible historic property (i.e., *Laliik*). Potential adverse effects include

1 viewshed impacts as well as loss of native vegetation and habitat. Mitigation is identified in the final
2 proposed amended MOA.

3 5.3 Ecological Resources

4 Five areas of interest were evaluated in a specific ecological resources review (ECR #2010-600-018).
5 Those five areas were: (1) NRDWL/SWL; (2) and NRDWL/SWL support area; (3) 45 acres within the
6 145 acre initial borrow site development area of Borrow Area C; (4) Army Loop Road between Beloit
7 Avenue and the northeast corner of the NRDWL; and (5) existing Hanford Site gravel pit #6. Key
8 findings are summarized as follows.

- 9 • No plant or animal species protected under the federal *Endangered Species Act* (ESA), candidates for
10 such protection, or species listed by the Washington state government as threatened or endangered
11 were observed on or in the vicinity of the NRDWL/SWL closure project areas of potential effect.
12 There is some native or natural habitat present in the vicinity of the NRDWL and SWL, and care
13 should be taken to avoid or minimize damage to any vegetation.
- 14 • The entire support area beyond the NRDWL/SWL footprint is a part of the Washington State Natural
15 Heritage Program element occurrence of the bitterbrush/Indian rice sand dune complex on the
16 Hanford Site. Appropriate mitigation would be developed and approved following DOE/RL-96-32,
17 *Hanford Site Biological Resources Management Plan* (BRMP) and DOE/RL-96-88, *Hanford Site*
18 *Biological Resources Mitigation Strategy* (BRMiS) process. Development of a mitigation action plan
19 that incorporates a combination of mitigation options as described in the BRMiS will be required.
- 20 • In order to avoid disturbing nesting individuals of these and other migratory bird species, ground-
21 disturbing project work should be undertaken outside the nesting season of migratory birds on the
22 Hanford Site, generally March 15 through July 31. Project areas should be resurveyed during the
23 nesting/growing season prior to the commencement of ground disturbing work, which is anticipated
24 for November, 2010. Resurvey of the project areas should also include any new areas identified for
25 used as a support area.
- 26 • Ground-disturbing activities, such as those associated with the use of heavy equipment, may damage
27 habitat and transport, spread, and increase noxious weedy species. When feasible, off-road travel
28 should be minimized, and wheels and undercarriages of vehicles should be washed to minimize
29 transport of weed seeds.

30 5.4 Transportation

31 Potential impacts on traffic and transportation associated with closure activities are described in the
32 following section.

33 Heavy equipment, such as trucks, would be used to haul barrier material to NRDWL and SWL. For this
34 EA, the barrier materials would be transported from Area C (for silty loam), as well as some other
35 location [e.g., pea gravel could be obtained from existing borrow pit(s) on site or from a commercial
36 distributor in Benton/Franklin/Yakima County]. Miscellaneous wastes generated during closure activities
37 could be transported from NRDWL/SWL to an appropriate disposal facility on the Hanford Site (ERDF,
38 Central Waste Complex), or to offsite, non-hazardous disposal facilities.

39 Accident, injury, and fatality statistics from traffic accidents involving transport of construction materials
40 and wastes were compiled in Saricks and Tompkins (1999). In that document, the composite accident,
41 injury, and fatality rates for heavy-combination trucks on all road types in the State of Washington were
42 2.05E-07 accidents/truck-km, 1.4E-07 injuries/truck-km, and 5.3E-09 fatalities/truck-km. The proposed

1 action could result in approximately 1,000,000 truck-km. Based on the aforementioned conversion rates,
 2 this amount of traffic would not be expected to result in an accident or fatality (0.2 accidents and 0.005
 3 fatalities), but could result in an injury (1.4 injuries).

4 Mitigation of the potential for traffic accidents could include implementation of special provisions
 5 associated with truck crossings; examples include restricting crossings to daylight hours and outside
 6 scheduled shift changes on the Hanford Site, and installation of “truck crossing” and “stop” signs at
 7 appropriate locations.

8 **5.5 Human Health and Safety**

9 **5.5.1 Potential Radiological/Hazardous Chemical Contamination**

10 No radiological materials are expected to be encountered during closure activities. Since closure activities
 11 are associated with installation of a cover, minimal intrusion into disposed hazardous waste is anticipated.
 12 Therefore, only some small amounts of hazardous materials would be expected to be encountered during
 13 closure of NRDWL and SWL. Appropriate measures would be taken to protect workers during the
 14 construction operations and to contain any waste materials generated for disposal at permitted facilities.

15 **5.5.2 Potential Industrial Hazards**

16 The closure activities are estimated to require an additional 100,000 labor hours. DOE construction
 17 experience has resulted in 1.8 cases of recordable injury/illness per 200,000 labor hours during 2003 to
 18 2008 (DOE/EA-1660F). Therefore, no injuries or occupational illness are expected to occur as a result of
 19 the proposed actions.

20 **5.6 Waste Management**

21 DOE is implementing Executive Order 13123 (64 FR 30851), *Greening the Government Through*
 22 *Efficient Energy Management*; Executive Order 13148 (65 FR 24595), *Greening the Government*
 23 *Through Leadership in Environmental Management*; and associated DOE orders or guidelines, by
 24 reducing toxic chemical use and encouraging the development and use of clean and energy-efficient
 25 technologies. Program components include waste minimization, recycling, source reduction, energy-
 26 efficient building construction, and buying practices that give preference to products made from recycled
 27 materials. Closure activities and waste management activities would be conducted in accordance with this
 28 program. Implementation of the pollution prevention and waste minimization programs would also
 29 minimize the generation of secondary wastes.

30 Closure activities would be conducted pursuant to applicable regulations [i.e., as noted in Section 2.1,
 31 NRDWL would be closed pursuant to RCRA requirements as implemented through RCW 70.105 and
 32 the regulations promulgated thereunder in WAC 173-303; SWL would be closed as a corrective action
 33 pursuant to WAC 173-303-64620 (Ecology 2010). Closure activities would be consistent with
 34 requirements of the Tri-Party Agreement, which outlines the approach that DOE will take for permitting
 35 and closure of the Hanford RCRA-regulated treatment, storage, and disposal units

36 Liquid wastes, primarily consisting of waste water and sanitary sewage generated using portable facilities
 37 likely would be collected by a commercial vendor and sent to the City of Richland’s Publicly Owned
 38 Treatment Works for processing.

39 **5.7 Visual Resources**

40 Closure activities at NRDWL and SWL proposed in this EA are not expected to adversely impact visual
 41 resources by installation of a cover. Because of the remoteness of the area, visual impact from outside the

1 Hanford boundary is minimal. However, the proposed covers could be visible to some potential users
2 from locations within the Hanford Reach National Monument lands.

3 Visual impacts pertaining to Area C have been identified in the aforementioned amended MOA
4 (Appendix A). Therein, DOE has determined that excavation activities at Borrow Area C will result in an
5 adverse effect to National Register-eligible historic property (i.e., portions of a Native American
6 traditional cultural property known as *Laliik*). Potential adverse effects include viewshed impacts as well
7 as loss of native vegetation and habitat.

8 **5.8 Other Impacts**

9 Activities proposed in this EA are expected to result in environmental consequences similar to those of
10 most routine construction projects at a commercial industrial site. For many types of resources, these
11 impacts are expected to be negligible because of their temporary nature and the remote locations at which
12 the activities would take place. The anticipated impacts on other resources are discussed in the following
13 sections.

14 **5.8.1 Air Quality**

15 Operation of trucks and diesel-powered construction equipment would be expected to introduce quantities
16 of SO₂, NO₂, particulates, and other pollutants to the atmosphere, typical of similar-sized construction
17 projects. These releases would not be expected to cause any air-quality standards to be exceeded at
18 locations that are routinely occupied for any substantial period of time. As needed, dust generated during
19 soil excavation or barrier placement activities and vehicle movement over unpaved areas would be
20 minimized by watering or other dust-control measures. Routine traffic to maintain roads and equipment
21 may occasionally generate dust, depending on wind conditions during transit; however, no substantial air-
22 quality impacts associated with implementing the proposed action would be expected.

23 **5.8.2 Water Quality**

24 The presence of chemicals disposed of in NRDWL and SWL are not expected to impact water quality on
25 the Hanford Site. NRDWL (Table 1) and SWL were considered in cumulative impacts addressed in the
26 TC&WM EIS; therein (Section 6.3.6, “Water Resources”):

27 “Ongoing and future actions to cleanup the Central Plateau, as well as individual facility D&D
28 actions, combined with actions associated with the *TC & WM EIS* alternative combinations (see
29 Chapter 4, Section 4.4.5), are not expected to contribute to direct cumulative impacts on water resources.”

30 And

31 “Ongoing and future DOE actions, including many associated with the *TC & WM EIS* alternative
32 combinations, would have a positive, short-term and long-term effect on water resources. Site-wide
33 cleanup and closure actions and facility D&D would remove and immobilize contaminants in the Hanford
34 vadose zone and prevent or delay their entry into the groundwater and ultimately to the Columbia River.”

35 **5.8.3 Floodplains, Wetlands, and Water Quality**

36 Due to the location of NRDWL, SWL, and Area C, no potential impacts have been identified to
37 floodplains or wetlands.

38 **5.8.4 Geology and Soils**

39 Minimal impacts would be expected on geological resources, which consist principally of basalt outcrops,
40 Rupert Sand, and Burbank Loamy Sand, underlain by Ice Age Flood gravels, which are locally abundant.

1 The quantities of any materials necessary for recontouring involved would be relatively small and are
2 readily available from Borrow Area C.

3 5.8.5 Noise

4 Construction and demolition activities would generate noise typical of using heavy equipment and
5 transport of materials. Noise impacts are assessed by establishing regions of influence for residential,
6 commercial, and industrial receptors, with maximum allowable noise levels established for each region
7 (WAC 173-60). Because of the remote locations at which the proposed actions would occur, all receptors
8 (including Hanford) would be located well beyond the applicable “region of influence,” within which
9 noise levels are limited to specified levels.

10 5.8.6 Socioeconomics and Environmental Justice

11 For purposes of this analysis, it was estimated that about 200,000 labor hours would be required to
12 complete the proposed actions over the life of the project. The work is expected to be accomplished
13 largely using employees from the local workforce. Total nonagricultural employment in Benton and
14 Franklin Counties is over 100,000 people (Schau 2006), so even if construction creates additional service
15 sector jobs, the total increase in employment as a result of the proposed action would be less than 1
16 percent of the current employment level. Increases of less than 5 percent of an existing labor force have
17 been determined to have minimal effect on an existing community (DHUD 1976).

18 Per Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations*
19 *and Low-Income Populations* (59 FR 7629), DOE seeks to ensure that no group of people bears a
20 disproportionate share of negative environmental consequences resulting from proposed federal actions.
21 DOE has also considered the guidance issued by the CEQ in preparing its analysis of environmental
22 justice for this EA (CEQ 1997a).

23 Potential impacts on minority, American Indian, Hispanic or Latino, and low-income populations are
24 addressed herein by reference to the TC&WM EIS. That is, as stated in the TC&WM EIS, because access
25 to the Hanford Site is restricted to the public, the majority of potential environmental impacts from the
26 proposed action would be associated with onsite activities and would not affect populations residing
27 offsite; thus, the potential for environmental justice concerns is small. There are no impacts associated
28 with proposed activities within the scope of this EA that could reasonably be determined to affect any
29 member of the public; therefore, they would not have the potential for high and disproportionately
30 adverse impacts on minority or low-income groups or Native American Tribes in the vicinity of the
31 Hanford Site.

32 5.8.7 Resource Use

33 The proposed action would require relatively small quantities of resources for closure activities, operation
34 of equipment, transportation of materials and waste, and road maintenance. The materials required
35 include common fossil fuels to operate vehicles and backup electrical generators, none of which are
36 unique or in limited supply. Therefore, their use would not be expected to affect availability of these
37 resources regionally or locally.

38 Borrow materials would come from Borrow Area C and Hanford Site Pit #6. Offsite commercial sources
39 of gravel also could be used.

40 5.9 Cumulative Impacts

41 Cumulative impacts that might be associated with implementing the proposed landfill closure activities
42 are summarized in this section.

1 In 40 CFR 1508.7, the CEQ defines cumulative impact as:

2 ...the impact on the environment from the incremental impact of the action when added
3 to other past, present, and reasonably future actions regardless of what agency (federal or
4 nonfederal) or person undertakes such actions. Cumulative impacts can result from
5 individually minor but collectively significant actions taking place over a period of time.

6 However, CEQ cautioned that, “The continuing challenge of cumulative effects analysis is to focus on
7 important cumulative issues...” (CEQ 1997b).

8 The volume of waste disposed in NRDWL and SWL have been considered in the analysis of cumulative
9 impacts presented in the TC&WM EIS (as part of “Other DOE Actions at Hanford,” Section 6.3.12.2). It
10 is unlikely that there would be major impacts on the waste management infrastructure at Hanford because
11 sufficient capacity exists or would be constructed under the proposed Waste Management alternatives
12 presented in the TC&WM EIS.

13 Based on the results of analyses presented in the previous sections, impacts in all resource areas were
14 projected to be minimal.

15 Other ongoing or planned actions that might have impacts on the same area of interest would include
16 those associated with the following operations:

- 17 • CERCLA remediation projects
- 18 • Ongoing waste management and cleanup of the Hanford Site in general.

19 Consequences of closing NRDWL and SWL are expected to be less than those associated with cleanup of
20 other sites within Hanford. Activities are expected to be accomplished using the local workforce and
21 would not impact regional or sitewide labor availability. Because of the temporary nature of the activities
22 and their remote location, short-term cumulative impacts on air quality or noise with other Hanford or
23 regional construction and cleanup projects would be minimal. Wastes generated during the proposed
24 activities would be manageable within the capacities of existing facilities. Restoration of formerly
25 disturbed areas to a more natural state is expected to result in a net benefit to the ecological and visual
26 resources within the region.

27 A detailed analysis of cumulative impacts on the Hanford Site is provided in Chapter 6 of the TC&WM
28 EIS. Specifically addressing NRDWL and SWL, the TC&WM EIS (Section 6.3.12.2.3) states:

29 “The TPA outlines the approach that DOE will take for permitting and closure of the Hanford RCRA
30 regulated treatment, storage, and disposal units. These two landfills are included in a draft remedial
31 investigation/feasibility study work plan completed in September 2007 (DOE 2007b). The remedial
32 investigation/feasibility study process will be used to reach a decision that will meet requirements for
33 both National Priorities List cleanup and RCRA corrective action.”⁴

34 The proposed action would be expected to have negligible contribution to long-term cumulative impacts.
35 NRDWL and SWL do not contain radiological constituents of potential concern (COPCs) identified in
36 Section 6.4 of the TC&WM EIS. The chemical inventory of NRDWL (Section 2.1, Table 1 of the EA)
37 shows approximately (rounded) 26 kilograms of chromium and 11 kilograms of nitrate; this may be
38 compared to the 340,000 kilograms of chromium and 74,200,000 kilograms of nitrate from ‘other
39 activities’ (not including the contribution from tank closure, FFTF, or waste management) considered in
40 the TC&WM for release to groundwater (TC&WM EIS, Table 6-12).

⁴ NOTE: DOE 2007b refers to DOE/RL-2004-60.

1 5.10 Mitigation of Potential Impacts of the Proposed Action

2 Various types of mitigation might be required for landfill closure activities proposed in this EA,
3 depending on the nature of specific actions to be carried out, and the outcomes of surveys conducted
4 before and during operations. DOE has established policies and procedures for management of ecological
5 and cultural resources and mitigation as necessary when actions might affect such resources (BRMP,
6 HCRMP, and BRMiS). Specific mitigation activities (e.g., field monitoring) have been identified in the
7 cultural resources review and ecological resources reviews (HCRC# 2010-600-018 and ECR # 2010-600-
8 018, respectively) and the final proposed amended MOA (Appendix A).

9 General methods could be used to minimize potential adverse effects of closure activities. Possible
10 mitigations include actions such as conducting work during the colder months, taking precautions during
11 fire hazard season, and conducting field operations outside of migratory bird nesting season; limiting use
12 of heavy equipment and vehicles to areas that are graveled, paved, and/or previously disturbed when
13 practicable; revegetating with native species and/or locally derived plant material; and minimizing the
14 chance of transporting weed seeds on the undercarriages of vehicles.

15 Health and safety procedures established by site contractors would mitigate risks to workers from the
16 proposed activities, and special procedures would be imposed where needed to manage risks from
17 working in the unique environment at the Hanford Site.

18 As noted in Section 5.4, mitigation of the potential for traffic accidents could include implementation of
19 special provisions associated with truck crossings; examples include restricting crossings to daylight
20 hours and outside scheduled shift changes on the Hanford Site, and installation of “truck crossing” and
21 “stop” signs at appropriate locations.

22 5.11 Environmental Impacts of Partial RTD/Complete RTD Alternatives

23 The Partial RTD alternative does not support DOE’s request for approval of the aforementioned closure
24 plans (DOE/RL-90-17 and DOE/RL-2008-54) submitted to Ecology for approval. Further, this alternative
25 would increase worker exposure to hazardous materials, such as asbestos, during retrieval operations.
26 Direct handling of waste materials would be expected to result in greater short-term and long-term
27 cumulative impacts.

28 Similar to Partial RTD, the Complete RTD alternative also does not support DOE’s request for approval
29 of aforementioned closure plans (DOE/RL-90-17 and DOE/RL-2008-54) submitted to Ecology for
30 approval. Additionally, this alternative would further increase worker exposure to hazardous materials
31 during retrieval operations beyond that in Partial RTD (Section 3.2.1), with attendant greater short-term
32 and long-term cumulative impacts. Additionally, as this alternative effectively equates to open pit mining,
33 there could be substantial visual and land use impacts.

34 5.12 Environmental Impacts of the No-Action Alternative

35 In the No-Action Alternative, the NRDWL and SWL would continue to be non-operational. The impacts
36 of this alternative would be similar to those that currently exist, although continued exposure to the
37 elements could promote the release of hazardous materials to the atmosphere or groundwater, and
38 increase health and safety risks associated with future closure activities. By not taking action in the near
39 term, DOE would not take advantage of short-term funding under the ARRA, which would accelerate
40 completion of the activities with net beneficial impacts and reduce the cost and potential health and safety
41 risks associated with carrying them out at a later time.

1 **5.13 Costs**

2 Rough-order-of-magnitude costs for the alternatives are provided for perspective.

Table 5-1. Rough-Order-of-Magnitude Costs for the Alternatives

Alternative	Total Present-Worth Cost (2010 dollars)
No Action	\$5,700,000
Proposed Action	\$31,600,000
Partial RTD	\$656,000,000
Complete RTD	\$2,890,000,000

3

6 Environmental Permits and Regulatory Requirements

It is the policy of DOE to carry out its operations in compliance with all federal, state, and local laws and regulations; Presidential executive orders; DOE orders; and procedures. Both federal and state laws apply to closure activities. Based on the types of activities to be conducted, it is anticipated that the following environmental requirements would be most applicable.

- Hazardous Waste Management.** RCRA, RCW 70.105, and WAC 173-303 apply to the generation, transport, treatment, storage, and disposal of hazardous and dangerous wastes. RCRA regulations require treatment of many hazardous wastes before they can be disposed of in landfills. RCRA permits are required for the treatment, storage, or disposal of hazardous wastes. Ecology has been authorized by EPA to administer the RCRA program within Washington, using its own dangerous waste regulation program in lieu of major portions of the RCRA program. The state regulations include a larger universe of regulated materials than the federal hazardous waste program.

As noted previously, closure plans have been submitted to Ecology in their capacity as the regulatory agency overseeing WAC 173-303, and WAC 173-350, “Minimum Functional Standards for Solid Waste Handling.” This initiates the review/approval process, including a 45-day public review process, of the Tri-Party Agreement Action Plan (Section 9.2.2, “Part B Permit Applications and Closure/Postclosure Plans”) (Ecology et al. 1989).

Ecology has determined (Ecology 2010) that the same closure/final cover, post-closure care, groundwater monitoring, and other applicable requirements developed for NRDWL will apply to SWL as a corrective action pursuant to WAC 173-303-64620. The requirements of WAC 173-350 will be satisfied through the deferral option in WAC 173-350-710(8). Ecology will waive the solid waste permitting requirement by deferring to the Hanford Facility Dangerous Waste Permit that will include corrective action requirements pursuant to WAC 173-303-64620.

- Protection of Plant and Animal Species.** The *Endangered Species Act*, *Bald and Golden Eagle Protection Act*, and *Migratory Bird Treaty Act* all identify requirements that must be met to protect native plant and animal species and the ecosystems upon which they depend. Two laws are most pertinent to the proposed action: (1) the *Endangered Species Act* requires that if a federal action may affect a threatened or endangered species or designated critical habitat, the agency must consult with the USFWS or National Marine Fisheries Service to ensure the action is not likely to jeopardize the continued existence of these species, and (2) the *Migratory Bird Treaty Act* prohibits harm to migratory birds, their nests, or eggs.
- Cultural and Historical Resource Protection.** Federal agencies must preserve and protect cultural resources in a spirit of stewardship to the extent feasible given the agency’s mission. DOE responsibilities are defined by a number of regulations and policies, including the *National Historic Preservation Act*, the *Native American Graves Protection and Repatriation Act*, and the *DOE Native American Indian & Alaska Native Tribal Government Policy* (DOE 1992, 2006). In particular, under the *National Historic Preservation Act* is the law most relevant to the proposed action; it requires that agencies consider the effects of their actions on historic properties included in or eligible for inclusion in the National Register of Historic Places.
- Air Pollution Notice of Construction and Approval Order.** These regulations require the submission of a Notice of Construction application to the Benton Clean Air Authority, and its review and approval, before a new emission source such as a diesel generator may be installed and operated. The application must demonstrate that installed equipment uses the Best Available Control Technology for regulated air emissions. The regulatory drivers are 40 CFR 61, “National Emission

1 Standards for Hazardous Air Pollutants;” WAC 173-400, “General Regulations for Air Pollution
2 Sources;” WAC 173-401, “Operating Permit Regulations;” WAC 173-460, “Controls for New
3 Sources of Toxic Air Pollutants;” and “Benton Clean Air Authority Regulation 1” (Benton Clean Air
4 Authority 2005). The responsible agency is the Benton Clean Air Authority.

- 5 • **Transportation.** Transportation regulations include the submission of an Application for General
6 Permit for United States Government Agencies for construction, operation, and maintenance of an
7 approach for hauling material across State roads. DOE has been issued State Permit No. 44422 by the
8 Washington State Department of Transportation (under WAC 468-34, “Utility lines-franchises and
9 permits”) for hauling material across SR240; special provisions include use restrictions and signage.

10

7 Notice to Tribal and Government Agencies and Other Interested Parties

Advance notice of DOE's intent to prepare this EA and briefings as requested were provided to various Tribal governments, agencies, and other organizations. In addition, the draft EA was provided to the following for review and comment.

- Nez Perce Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Colville Indian Reservation
- Wanapum
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Ecology
- Oregon Department of Energy
- Franklin County
- Hanford Advisory Board
- Benton County
- City of Richland.

The Final EA will be made available in the DOE Public Reading Room (Consolidated Information Center at Washington State University-Tri-Cities) and through the DOE Richland Operations Office website (<http://www.hanford.gov/rl/?page=86&parent=52>).

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8 References

8.1 Regulations, Notices, and Laws

8.1.1 Code of Federal Regulations (CFR) (Online at <http://www.gpoaccess.gov/cfr/index.html>)

10 CFR 1021, “National Environmental Policy Act Implementing Procedures,” *Code of Federal Regulations*, U.S. Department of Energy.

36 CFR 800, “Protection of Historic Properties,” *Code of Federal Regulations*, U.S. Department of Energy.

40 CFR 61, “National Emission Standards for Hazardous Air Pollutants,” *Code of Federal Regulations*, U.S. Environmental Protection Agency.

40 CFR 1500-1508, “Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act,” *Code of Federal Regulations*, U.S. Environmental Protection Agency.

50 CFR 10.13, “List of Migratory Birds,” *Code of Federal Regulations*, U.S. Department of the Interior.

50 CFR 17.11, “Endangered and Threatened Wildlife,” *Code of Federal Regulations*, U.S. Department of the Interior.

50 CFR 17.12, “Endangered and Threatened Plants,” *Code of Federal Regulations*, U.S. Department of the Interior.

8.1.2 Federal Register (FR) Notices (online at <http://www.gpoaccess.gov/fr/index.html>)

59 FR 7629, “Executive Order 12898 of February 11, 1994: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” *Federal Register* (February 16, 1994). Online at <http://www.epa.gov/fedreg/eo/eo12898.htm>

64 FR 30851, “Executive Order 13123 of June 3, 1999: Greening the Government through Efficient Energy Management,” *Federal Register* (June 8, 1999). Online at <http://www1.eere.energy.gov/femp/pdfs/eo13123.pdf>

64 FR 61615, “Record of Decision: Hanford Comprehensive Land-Use Environmental Impact Statement,” *Federal Register* (November 12, 1999). Online at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=1999_register&docid=99-29325-filed.pdf

65 FR 24595, “Executive Order 13148 of April 21, 2000: Greening the Government through Leadership in Environmental Management,” *Federal Register* (April 26, 2000). Online at <http://ceq.hss.doe.gov/nepa/regs/eos/eo13148.html>

71 FR 5655, “Notice of Intent To Prepare the Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, WA.” Online at http://nepa.energy.gov/nepa_documents/noi/5655.pdf

72 FR 3919, “Executive Order 13423 of January 24, 2007. Strengthening Federal Environmental, Energy, and Transportation Management.” *Federal Register* (January 26, 2007). <http://edocket.access.gpo.gov/2007/pdf/07-374.pdf>

- 1 74 FR 52117, “Executive Order 13514 of October 5, 2009. Federal Leadership in Environmental, Energy,
2 and Economic Performance,” *Federal Register* (October 8, 2009).
3 <http://edocket.access.gpo.gov/2009/pdf/E9-24518.pdf>
- 4 73 FR 55824, “Amended Record of Decision for the Hanford Comprehensive Land-Use Plan
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Appendix A

Final Proposed Amended Memorandum of Agreement

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**AMENDED MEMORANDUM OF AGREEMENT
FOR USE OF THE BORROW SOURCE AT AREA C,
HANFORD SITE, RICHLAND, WASHINGTON
BETWEEN THE U. S. DEPARTMENT OF ENERGY,
THE WASHINGTON STATE HISTORIC PRESERVATION OFFICE, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
WITH THE PARTICIPATION OF CONSULTING PARTIES: CONFEDERTATED
TRIBES AND BANDS OF THE YAKAMA NATION, CONFEDERATED TRIBES OF
THE UMATILLA INDIAN RESERVATION, THE NEZ PERCE TRIBE, AND THE
WANAPUM**

WHEREAS, the U.S. Department of Energy (DOE), will be constructing a soil surface barrier over waste sites and/or landfills located on the Hanford Site. This initial barrier will be located on the Hanford Site and will entail use of approximately 450,000 cubic yards of fine-grained soils from borrow source Area C. Borrow source Area C is located in the 600 Area. Construction of a surface barrier will cover a waste site and/or landfill located on the Hanford Site (Figure 1). Excavation will directly disturb approximately 40-acres up to a depth of approximately 15 feet. Approximately 5 additional acres may also be used for work staging areas and to maintain safe access around the excavation area. Transportation related to the use of Borrow Area C will be addressed in project specific NEPA or CERCLA documentation. The surface barrier will be monitored for effectiveness over a period of at least 5 years; and

WHEREAS, DOE conducted a cultural resources review of a larger 145-acre area for Area C borrow source development in June 2006 under HCRC#2006-600-008. This action will focus on the approximately 45 acre development located within the original 145-acre cultural resource review area; and

WHEREAS, DOE has determined that excavation activities at the borrow Area C source will result in an adverse effect to National Register-eligible historic property (i.e., portions of a Native American traditional cultural property known as *Laliik*). Potential Adverse effects include viewshed, noise, and air quality impacts as well as loss of native vegetation and habitat; and

WHEREAS, area Tribes (Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Wanapum, herein referred to as Tribes) attach religious and cultural significance to Rattlesnake and Gable Mountains, and tribal access is protected under the American Indian Religious Freedom Act (1979) and Executive Order 13007; and

WHEREAS, DOE has consulted with the Washington State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), in accordance with Section 106 of the National Historic Preservation Act, 36 CFR Part 800.6(a) to resolve adverse effects on historic properties; and

WHEREAS, DOE seeks to avoid, minimize, or mitigate adverse effects to the National Register-eligible property.

Figure 1 – Hanford Site Map



NOW, THEREFORE, the signatories agree that DOE, will ensure the following stipulations are implemented in order to take into account the effects of the undertaking on historic properties, and that these stipulations shall govern the undertakings and all of its parts until this MOA expires or is terminated.

STIPULATIONS

DOE will ensure that the following stipulations are carried out:

A. MINIMIZATION, MITIGATION, MONITORING AND REPORTING

I. MITIGATE ADVERSE EFFECTS TO CULTURAL INTEGRITY OF HABITAT AND TO TRADITIONAL PLANTS

1. In consultation with the SHPO, ACHP, and Tribes, DOE will complete and distribute a culturally relevant native plant revegetation strategy for this 45 acre project within 12 months of signing this MOA.
2. In consultation with the SHPO, ACHP, and Tribes, DOE will update the habitat quality determination for the 45 acre portion of Area C borrow source, specifically focusing on the stabilized dune areas, within 6 months of signing this MOA.
3. In consultation with the SHPO, ACHP, and Tribes, DOE will implement a 5-year annual monitoring plan to confirm success of reclamation and health of wildlife habitat at the 45-acre area disturbed by project activities.
4. DOE will invite Tribes to participate in ecological surveys and revegetation efforts at Area C. DOE will notify the tribes at least one month prior to the anticipated initiation of surveys and re-vegetation efforts.

II. MINIMIZATION AND AVOIDANCE OF VISUAL, AIR QUALITY AND NOISE IMPACTS

5. To minimize visual and noise effects of project activities, DOE will coordinate timing of construction to assure that these activities do not unnecessarily interfere with Tribal ceremonial activities and religious use of Rattlesnake Mountain (*Laliik*). To assist DOE with implementing this stipulation, the tribes will notify the DOE Indian Nation Program at least one month prior to the anticipated ceremonial activities and religious uses of Rattlesnake Mountain (*Laliik*).
6. To minimize visual and air quality impacts resulting from the excavation, DOE will implement interim soil stabilization controls through the implementation of dust control procedures such as the application of a tackifier and routine watering of the area.
7. To minimize long-term visual and air quality impacts resulting from the excavation, DOE will develop a long-term reclamation plan within 12 months of signing this MOA.
8. To minimize long-term visual and air quality impacts resulting from the excavation, DOE will monitor the viewshed from a culturally relevant perspective on a seasonal basis.

III. CULTURAL RESOURCES MONITORING

9. DOE will conduct routine periodic cultural resources monitoring, with tribal participation, during excavation activities. Additional details are included in the Implementation Plan.
10. DOE will assure that all project activities adhere to Inadvertent Discovery of Human Remains Protocols and Unanticipated Discovery Protocols outlined in the U.S. Department of Energy, Richland Operations Office, Hanford Cultural Resources Management Plan (DOE 2003) and in compliance with the Native American Graves Protection and Repatriation Act (NAGPRA) 1990 and 36 CFR 800.13.

IV. REPORTING

11. DOE will provide quarterly electronic reporting to all parties on the implementation of the stipulations 1-10 in this MOA over the duration of the project. Initiation of these quarterly updates will occur 3 months after earth-moving activities have started at Borrow Area C
12. DOE will provide annual reporting to all parties on the implementation and results of the monitoring plan of the success of revegetation and soil reclamation/ stabilization efforts over the course of the five-year monitoring effort (as per the Revegetation Plan and Reclamation Plan, identified in stipulations 1 and 7).

ADMINISTRATIVE PROVISIONS

Dispute Resolution

The Parties will work together to collaborate and resolve any differences or disputes informally. If necessary, the Parties will elevate significant disputes to the appropriate management levels of the organizations for resolution. At this point the following steps will be followed:

1. Should the SHPO or ACHP raise an objection to an action taken under the MOA, or have a dispute regarding fulfillment of the terms of this MOA, that party will file a written notice with RL.
2. Upon receipt of a written notice from the SHPO or ACHP, RL will consult with the party filing the notice to resolve the dispute. RL will also notify the Tribes of the objection or dispute.
3. If RL cannot resolve the objection or dispute within 60 calendar-days of receipt of the written notice, DOE will forward to the ACHP documentation of the dispute, a written proposal for its resolution, and request the ACHP's comment.
4. Within 30 calendar-days of receipt of the written submittal, the ACHP shall either:
 - a. Notify RL that it will not consider the dispute or provide recommendations, in which case the Agency may proceed with the proposed action; or,

- b. Concur with RL's proposed response to the dispute, whereupon DOE may proceed in accordance with the agreed-upon response; or,
 - c. Provide RL with recommendations, which RL will consider in good faith in reaching a final decision regarding a response to the dispute.
5. RL shall take into account any SHPO or ACHP recommendation or comment provided in accordance with this stipulation with reference only to the subject of the objection or dispute; RL's responsibility to carry out all actions under this MOA that are not the subject(s) of the objection or dispute shall remain unchanged. While the dispute is being resolved, the MOA continues in effect without change or suspension.
 6. If the ACHP or SHPO is contacted by a concurring party Tribe or by a member of the public to discuss a significant concern or objection about implementation of the terms of this MOA, the contacted entity will notify RL of the issue.
 7. RL will keep consulting parties and Tribes apprised of any concerns or objections raised and how the concern is resolved.

Amendments

The signatories may propose, in writing, and will consider amendments to this MOA. Notice of any proposed amendments will also be provided to the other parties to this MOA.

Effective Date and Termination

This amended MOA will become effective on the date that it has been signed by all signatory parties and then supersedes all provisions of the existing MOA (which was effective April 4, 2009). DOE has committed significant resources to meet the terms of this agreement prior to its effective date, and will continue to commit significant resources to planning and implementing the reclamation. Any signatory party who wishes to terminate the MOA must do so in accordance with the regulations at 36 CFR 800.6(c)(8).

Coordination

RL will ensure that each consulting party is provided a copy of the fully executed MOA as amended.

Signatory Parties:

U.S. Department of Energy

By: _____ Date: _____
David A. Brockman
Manager

Washington State Historic Preservation Office

By: _____ Date: _____
Dr. Allyson Brooks
Washington State Historic Preservation Officer

Advisory Council on Historic Preservation

By: _____ Date: _____
John M. Fowler
Executive Director

Concurring Parties:

Confederated Tribes of the Umatilla Indian Reservation

By: _____ Date: _____

Confederated Tribes and Bands of the Yakama Nation

By: _____ Date: _____

Nez Perce Tribe

By: _____ Date: _____

Wanapum

By: _____ Date: _____