

AR TARGET SHEET

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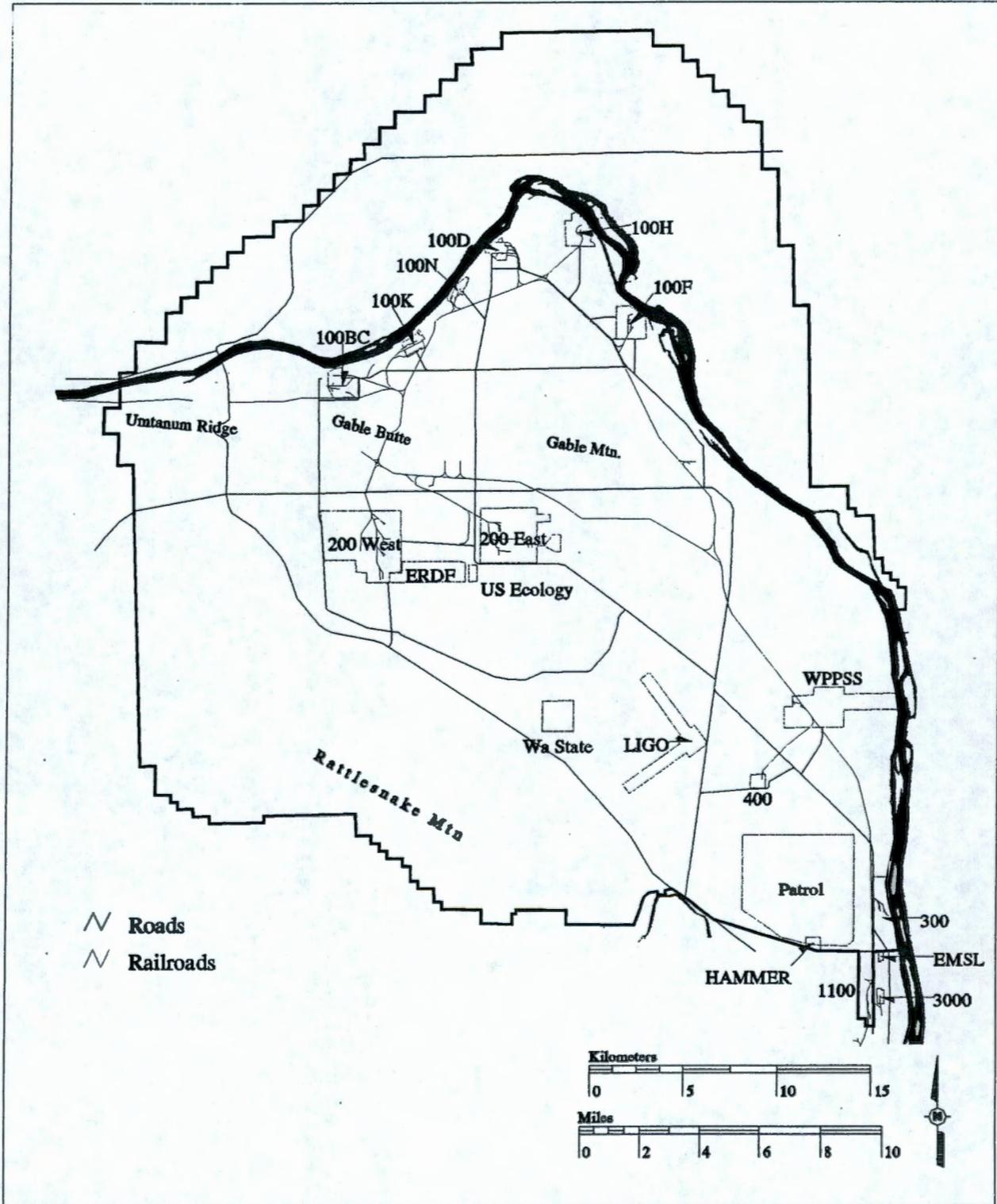
DOCUMENT #: DOE/EIS-0222F

TITLE: Final Hanford Comprehensive
Land-Use Plan Environmental
Impact Statement

EDMC#: 0051946

SECTION: 3 of 6

1 **Figure 4-29. Transportation Network on the Hanford Site**
 3 **(DOE-RL 1990a).**
 4
 5



1 SR 24 enters the Hanford Site from the west, continues eastward across the northern-most
2 portion of the Hanford Site, and intersects SR 17 approximately 24 km (15 mi) east of the Hanford
3 Site boundary. SR 17 is a north-south route that links I-90 to the Tri-Cities and joins U.S. Route
4 395, which continues south through the Tri-Cities. SR 14 connects with I-90 at Vantage,
5 Washington, and provides ready access to I-84 at several locations along the Oregon and
6 Washington border. SRs 240 and 24 traverse the Hanford Site and are maintained by
7 Washington State. Other roads within the Hanford Site are maintained by DOE (PNNL 1996a).

8 9 **4.7.9 Utilities**

10
11 The principal source of water in the Tri-Cities and the Hanford Site is the Columbia River.
12 The potable water systems of Richland, Pasco, and Kennewick drew a large portion of the
13 50.6 billion L (13.43 billion gal) used in 1996 from the Columbia River. Each city operates its own
14 supply and treatment system. The Richland water supply system derives about two-thirds of the
15 water used from the Columbia River, while the remainder is split between a well field in North
16 Richland and other groundwater wells. Total usage by the City of Richland in 1997 was
17 26.1 billion L (6.9 billion gal). This usage represents approximately 65 percent of the maximum
18 supply capacity. The City of Pasco system also draws water from the Columbia River. In 1995,
19 Pasco consumed 9.5 billion L (2.6 billion gal). The Kennewick system uses two wells and the
20 Columbia River as a water supply. These wells serve as the sole source of water between
21 November and March and can provide approximately 43 percent of the total maximum supply of
22 30 billion L (8 billion gal). Total 1997 usage in Kennewick was 12.7 billion L (3.36 billion gal).
23 (Neitzel et al. 1998).

24
25 The major incorporated areas of Benton and Franklin counties are served by municipal
26 wastewater treatment systems, whereas the unincorporated areas are served by onsite septic
27 systems. The Richland waste water treatment system is designed to treat a total capacity of
28 45.5 million L/day (12 million gal/day) and processed an average flow of 23.5 million L/day
29 (6.2 million gal/day) in 1997. The Kennewick system similarly has significant excess capacity; with
30 a treatment capability 32.9 million L/day (8.7 million gal/day) and 1997 usage of 19.3 million L/day
31 (5.13 million gal/day). The Pasco waste treatment system processed an average 4.9 million L/day
32 (1.3 million gal/day), while the system is capable of treating 16.3 million L/day (4.3 million gal/day)
33 (Neitzel et al. 1998).

34
35 Natural gas, provided by the Cascade Natural Gas Corporation, serves a small portion of
36 Tri-Cities residents, with 6,182 residential customers in April 1998 (Neitzel et al. 1998).

37
38 In the Tri-Cities, electricity is provided by the Benton County Public Utility District, Benton
39 Rural Electrical Association, Franklin County Public Utility District, and City of Richland Energy
40 Services Department. All of the power provided by these utilities in the local area is purchased
41 from the BPA, a Federal power marketing agency. The average rate for residential customers
42 served by the four local utilities is approximately \$0.049/kWh. Electrical power for the
43 Hanford Site is purchased wholesale from the BPA. Energy requirements for the Hanford Site
44 during fiscal FY 1997 exceeded 319 million kWh, for a total cost of nearly \$7.7 million (Neitzel et
45 al. 1998).

46
47 In the Pacific Northwest, hydropower (and to a lesser extent, coal and nuclear power),
48 constitute the regional electrical generation system. The system is capable of delivering
49 approximately 20,300 average megawatts of guaranteed energy; of that amount, approximately
50 62 percent is derived from hydropower, 16 percent from coal, and less than 7 percent from nuclear
51 plants. One commercial nuclear power plant (WNP-2) remains in service in the Pacific Northwest,
52 with an average generating capability of 833 megawatts. The Trojan Nuclear Power Plant in
53 Oregon was permanently shut down on January 4, 1993, and is being buried at Hanford's
54 commercial low-level waste (LLW) facility.

1 The regional electrical power system, more than any other system in the nation, is
2 dominated by hydropower. In a given peak-demand hour, the hydropower system is capable of
3 providing nearly 30,000 megawatts of capacity. Variable precipitation and limited storage
4 capabilities alter system output from 12,300 average megawatts under critical water conditions to
5 20,000 average megawatts in record high-water years. The reliance on hydroelectric power in the
6 Pacific Northwest means that the system is more constrained by seasonal variations in peak
7 demand than in meeting momentary peak demand.

8
9 Additional constraints on hydroelectric production are measures designed to protect and
10 enhance the production of salmon, as many salmon runs have dwindled to the point of being
11 threatened or endangered. These measures, outlined by the Northwest Power Planning Council
12 (NPPC) Columbia River Basin Fish and Wildlife Program, include minimum flow levels and a
13 "water budget," which refers to water in the Columbia and Snake rivers that is released to speed
14 the migration of young fish to the sea. Generation capacity of the hydroelectric system is
15 decreased with these measures, as less water is available to pass through the turbines.

16
17 Throughout the 1980s, the Pacific Northwest had a surplus of electric power. This surplus
18 has been exhausted, however, and the system only supplies enough power to meet regional
19 electricity needs. In the 1991 Northwest Power Plan, the NPPC set a goal of purchasing more
20 than 1,500 megawatts of energy savings by the year 2000 to help the existing system meet the
21 rising electricity demand. The NPPC estimates that the Pacific Northwest will need an additional
22 2,000 megawatts over 1991 consumption by the turn of the century (PNNL 1996a).

23 24 **4.7.10 Site Infrastructure**

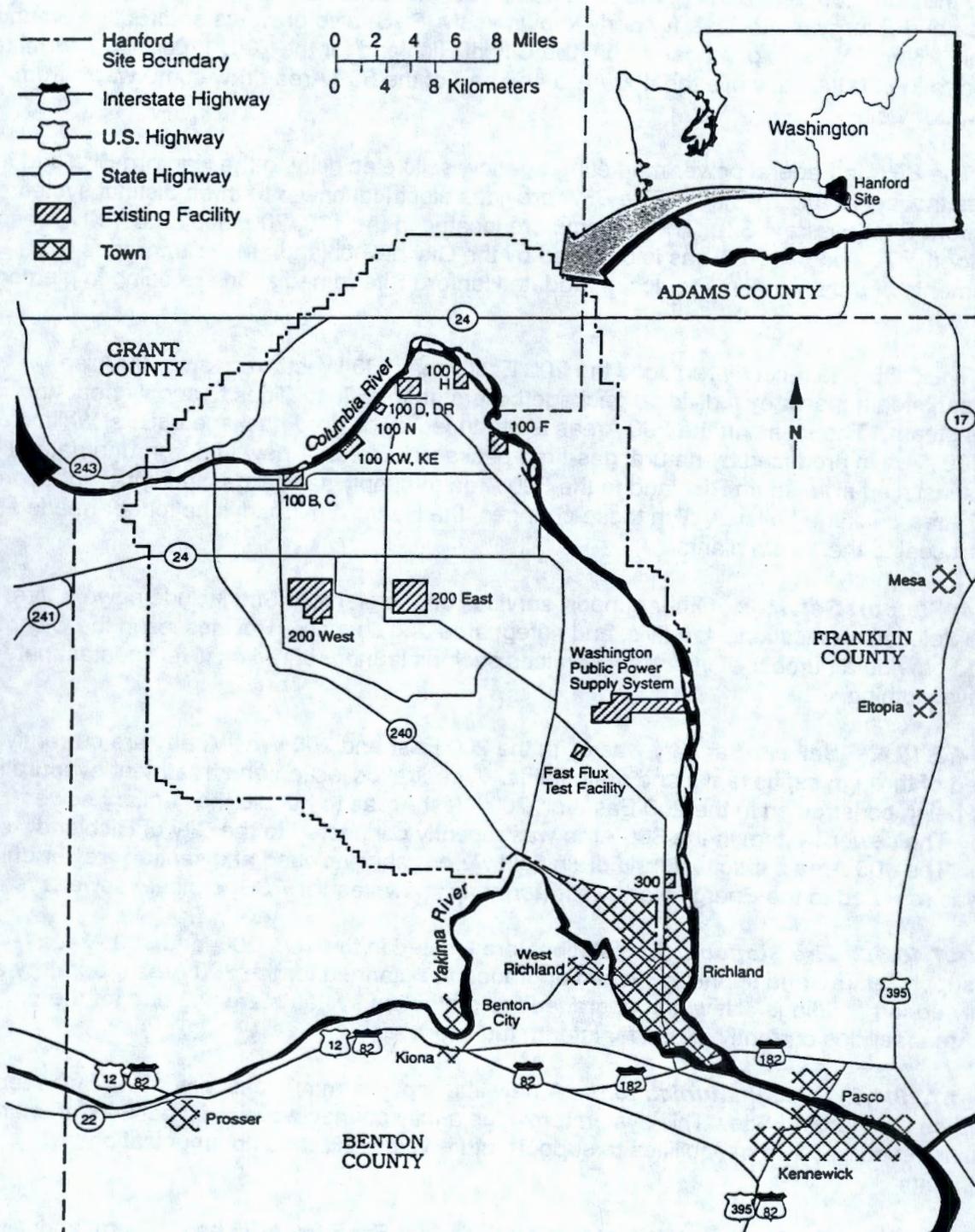
25
26 The Hanford Site infrastructure is a significant resource for furthering industrial
27 development of the region. Key elements of this infrastructure include facilities, road and rail
28 systems, utilities, and support services (DOE-RL 1994a).

29
30 **4.7.10.1 Facilities.** Onsite programmatic (60 percent) and general purpose facilities (40 percent)
31 provide 600,000 m² (6.5 million ft²) of space. General purpose facilities include offices,
32 laboratories, shops, warehouses, and other facilities. The programmatic space supports an
33 evaporator, filter, waste recovery, waste treatment, waste storage, and R&D laboratories. Many of
34 these facilities are over 30 years old; however, upgrades and expansion of some facilities could
35 occur as remediation progresses.

36
37 **4.7.10.2 Road and Rail Systems.** The transportation network is well developed on the
38 Hanford Site with approximately 460 km (approximately 288 mi) of roads onsite (Figure 4-29).
39 SR 24 crosses the Hanford Site primarily on the Wahluke Slope. SR 240 crosses the Hanford Site
40 on the southwest and serves as the boundary between the ALE Reserve and the rest of the Site.
41 A Site access road from SR 240 to the 200 West Area was completed in December 1994.
42 Upgrades are planned for road capacities north of the Wye Barricade in support of remediation
43 activities. Road maintenance will continue on all active roads. The 1100 Area roads were recently
44 upgraded to improve traffic circulation and access.

45
46 There are approximately 204 km (127 mi) of rail line on the Hanford Site (see Figure 4-30).
47 The rail system begins at the Richland Junction (Columbia Center), where it joins the Union Pacific
48 commercial tracks and runs to the abandoned Chicago, Milwaukee, St. Paul, and Pacific
49 right-of-way near the Vernita Bridge, located on the north boundary of the Hanford Site.
50 Approximately 35 km (22 mi) of track are in "out-of-service" condition. The in-service track
51 accommodates 4,000 movements of 1,500 rail cars annually. A railroad spurline from the
52 1100 Area to the City of Richland's Horn Rapids Industrial Park is planned to serve new industrial
53 development in the Park. The Hanford railroad between the Richland Junction and Horn Rapids
54 Road was has been transferred from DOE to the Port of Benton along with the 1100 Area.

1 **Figure 4-30. Transportation Routes in the Vicinity of the**
 3 **Hanford Site.**
 4



1
2 **4.7.10.3 Utilities.** The Hanford Site water system includes numerous buildings, pumps, valve
3 houses, reservoirs, wells, and a distribution piping system that delivers water from the Columbia
4 River to all areas of the Hanford Site. The export water system, which is the largest, delivers
5 water to the 100, 200, and parts of the 600 Areas from the Columbia River (Figure 4-31). The
6 300 Area and Energy Northwest (formerly known as WPPSS) also draw water directly from the
7 Columbia River. Water is purchased from the City of Richland for the 700, 1100, and intermittently
8 provided to the 300 Area, while the 400 Area and part of the 600 Area draw some water from
9 groundwater wells.

10
11 The BPA, a Federal power marketing agency, sells electricity to the Hanford Site and the
12 agencies that serve the Tri-Cities. The BPA provides electrical power to three distinct systems on
13 the Hanford Site (Figure 4-32). The systems are located in the 100, 200, 300, and 400 Areas.
14 Power for the 700 and 1100 Areas is provided by the City of Richland. Major upgrades or
15 replacements of these systems to accommodate Hanford Site remediation are being implemented
16 or planned.

17
18 The DOE has recently replaced the 200 East Area, 200 West Area, and 300 Area
19 centralized steam plants by individual package boilers at specific facilities to supply heat and
20 process steam. The steam in the 200 Areas is produced by oil-fired package boilers, while steam
21 in the 300 Area is produced by natural gas-fired package boilers. A new underground natural gas
22 line was installed from south Richland to the 300 Area to supply natural gas in support of operating
23 the 300 Area package boilers. With these changes, the Hanford railroad is no longer needed to
24 transport coal to the steam plants.

25
26 **4.7.10.4 Support Services.** Other support services on the Hanford Site include sewers, fire
27 stations, telecommunications, landfills, and safeguards and security. Businesses in the City of
28 Richland provide a number of important services such as laundry of radioactively contaminated
29 protective clothing.

30
31 **4.7.10.4.1 Sewer.** Sanitary wastes in the 200 East and 200 West Areas are currently
32 disposed of through septic tanks and drain fields. A central collection and treatment evaporation
33 plant is being constructed in the 200 East and 200 West Areas to handle the sanitary sewer
34 system. The sewer system in the 300 Area was recently connected to the City of Richland's sewer
35 system. The 400 Area septic tank and drain field were recently closed and sanitary sewer effluent
36 liquid was rerouted to the Energy Northwest (formerly known as WPPSS) sanitary sewer system.

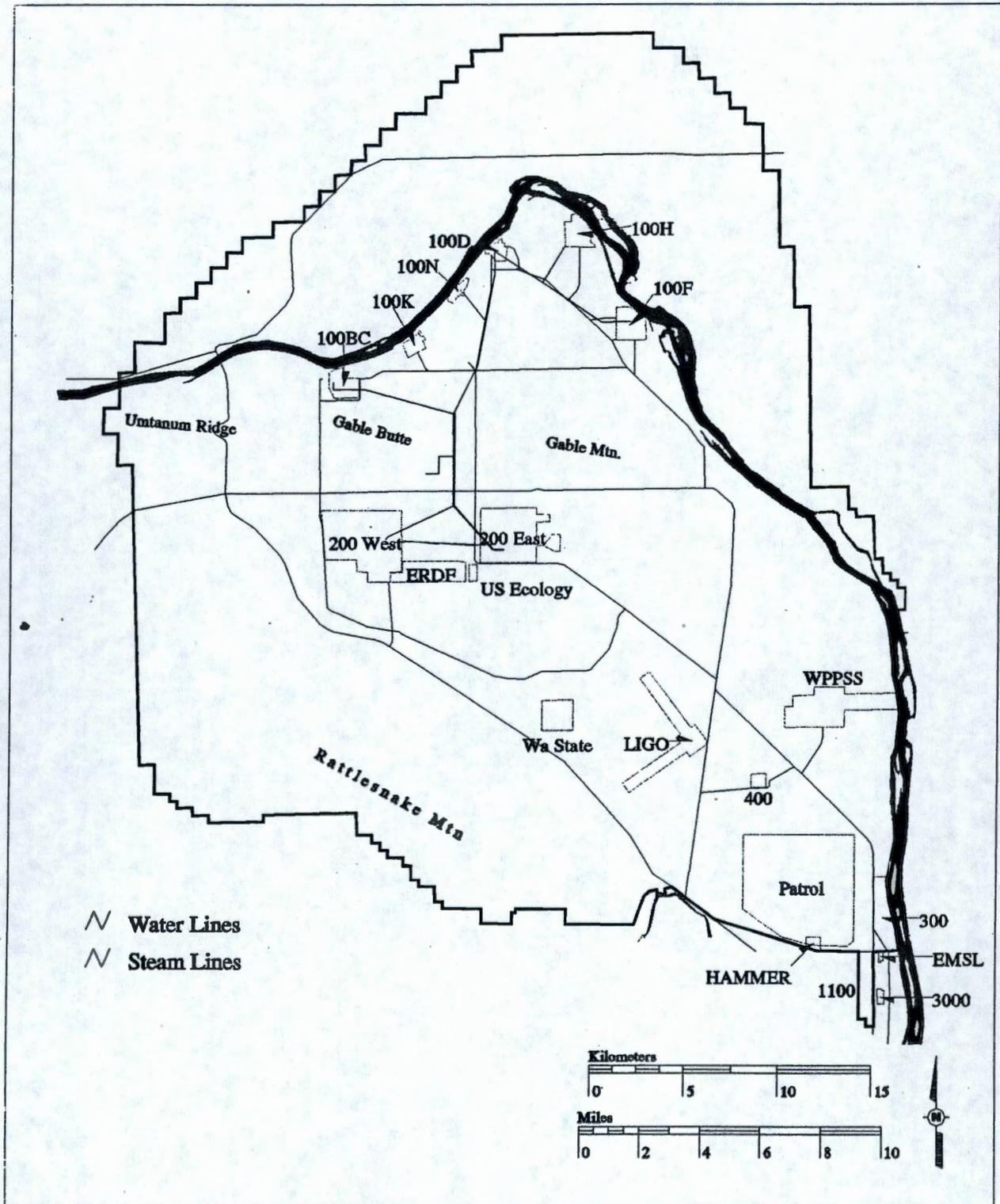
37
38 **4.7.10.4.2 Fire Stations.** Fire stations are located in the 100, 200, and 300 Areas.
39 Water supply, alarm, and sprinkler system upgrades are planned for the 300 Area laboratory and
40 general support buildings. New and upgraded fire protection systems are planned for the
41 100-K Area facilities currently in use for interim fuel storage.

42
43 **4.7.10.4.3 Telecommunications.** A new fiber optic communications network was recently
44 installed on the Hanford Site. This system provides a fully connected internal network of shared
45 computing resources and capabilities to support future voice and data communication
46 requirements.

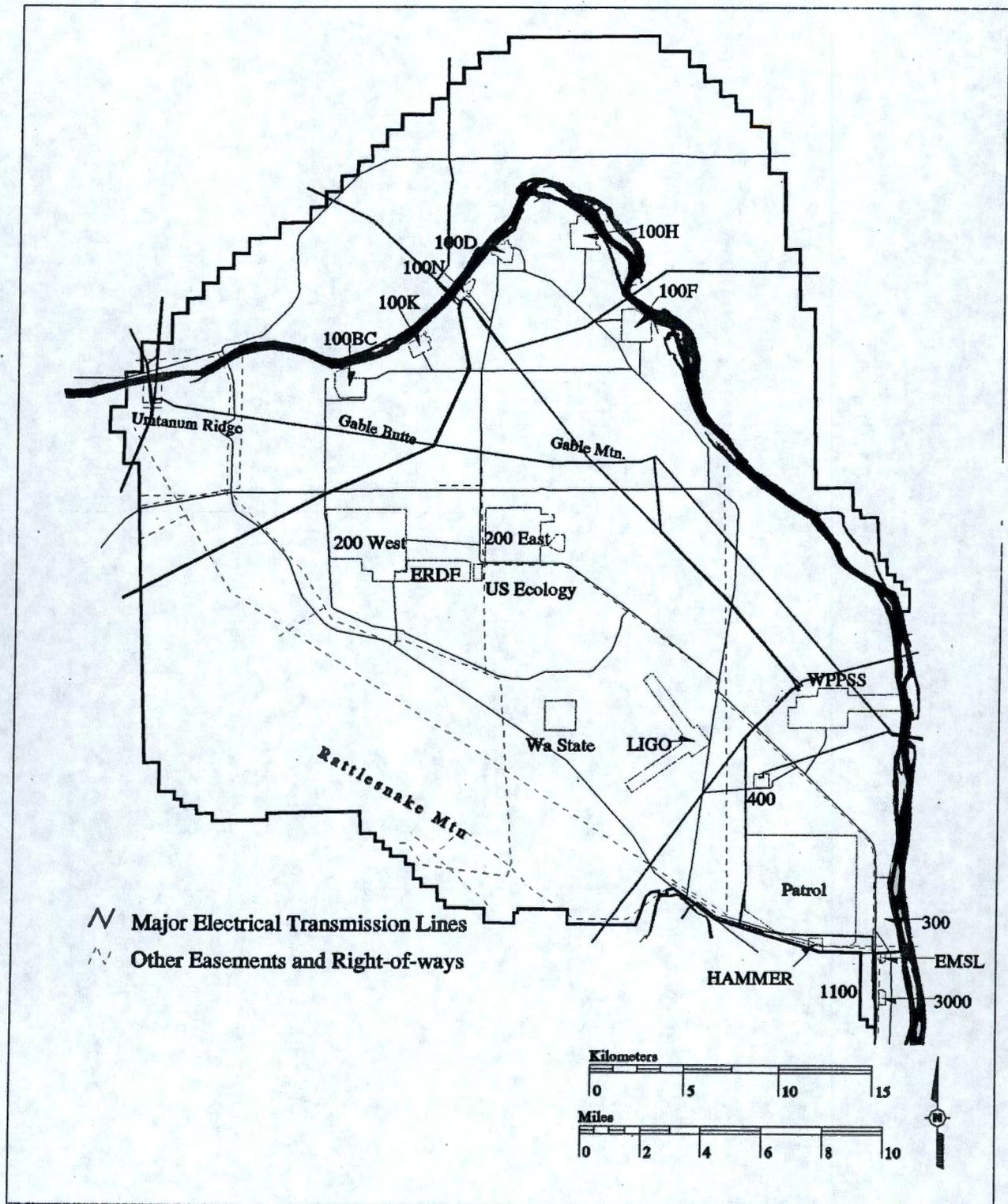
47
48 **4.7.10.4.4 Environmental Restoration Disposal Facility.** A 65 ha (160 ac) landfill
49 operates directly south of the 200 East and 200 West Areas to address the disposal of radioactive,
50 hazardous, asbestos, polychlorinated biphenyls (PCBs), and mixed wastes resulting from the
51 remediation of operable units on the Hanford Site. The facility can be expanded as needed, to a
52 maximum of 414 ha (1.6 mi²).

1 **Figure 4-31. Export Water System for the Hanford Site**
 2 **(DOE-RL 1990a).**

3
4



1 **Figure 4-32. Electrical System for the Hanford Site**
 3 **(DOE-RL 1990b).**



1 **4.7.10.4.5 Safeguards and Security.** A security force is employed onsite and a number
2 of systems are in place to control Hanford Site access, and protect classified and business-
3 sensitive information, property and personnel. The Benton County Sheriff's Office provides traffic
4 enforcement, criminal enforcement, and investigations onsite.
5
6

7 **4.8 Visual and Aesthetic Resources**

8

9 The land in the vicinity of the Hanford Site is generally flat with little relief. Rattlesnake
10 Mountain, rising to 1,060 m (3,477 ft) above mean sea level, forms the southeastern boundary of
11 the Hanford Site. Gable Mountain and Gable Butte are the highest land forms within the Hanford
12 Site (Figure 4-33). The view toward Rattlesnake Mountain is visually pleasing, especially in the
13 springtime when wildflowers are in bloom. Large rolling hills are located to the west and north.
14

15 The Columbia River, flowing across the
16 northern part of the Site and forming the eastern
17 boundary, is generally considered scenic, with its
18 contrasting blue against a background of dark
19 basaltic rocks and desert sagebrush. The White
20 Bluffs, steep whitish-brown bluffs adjacent to the
21 Columbia River, are a striking natural feature of the
22 landscape (see text box, "*Hanford Site Quick Facts:*
23 *Visual and Aesthetic Resources*").
24

Hanford Site Quick Facts:
Visual and Aesthetic Resources

Prominent natural features include the Columbia River, Saddle Mountains, Gable Butte, Rattlesnake Mountain, White Bluffs, and Gable Mountain.

25 SR 24 provides public access through the northern portion of the Hanford Site, primarily on
26 the north side of the Columbia River. Viewsheds along this highway include limited views of the
27 Columbia River when the road drops down into the river valley, crosses the river over the Vernita
28 Bridge, and climbs up out of the valley to a level plateau north of the river. A turnout on the north
29 side of the river offers views of the river and the B and C Reactors, with an interpretive sign
30 located nearby. A rest stop along the road just to the south of the river provides views of the
31 Umtanum Ridge to the west, the Saddle Mountains to the north, and the Columbia River valley to
32 the east and west.
33
34

35 **4.9 Noise**

36

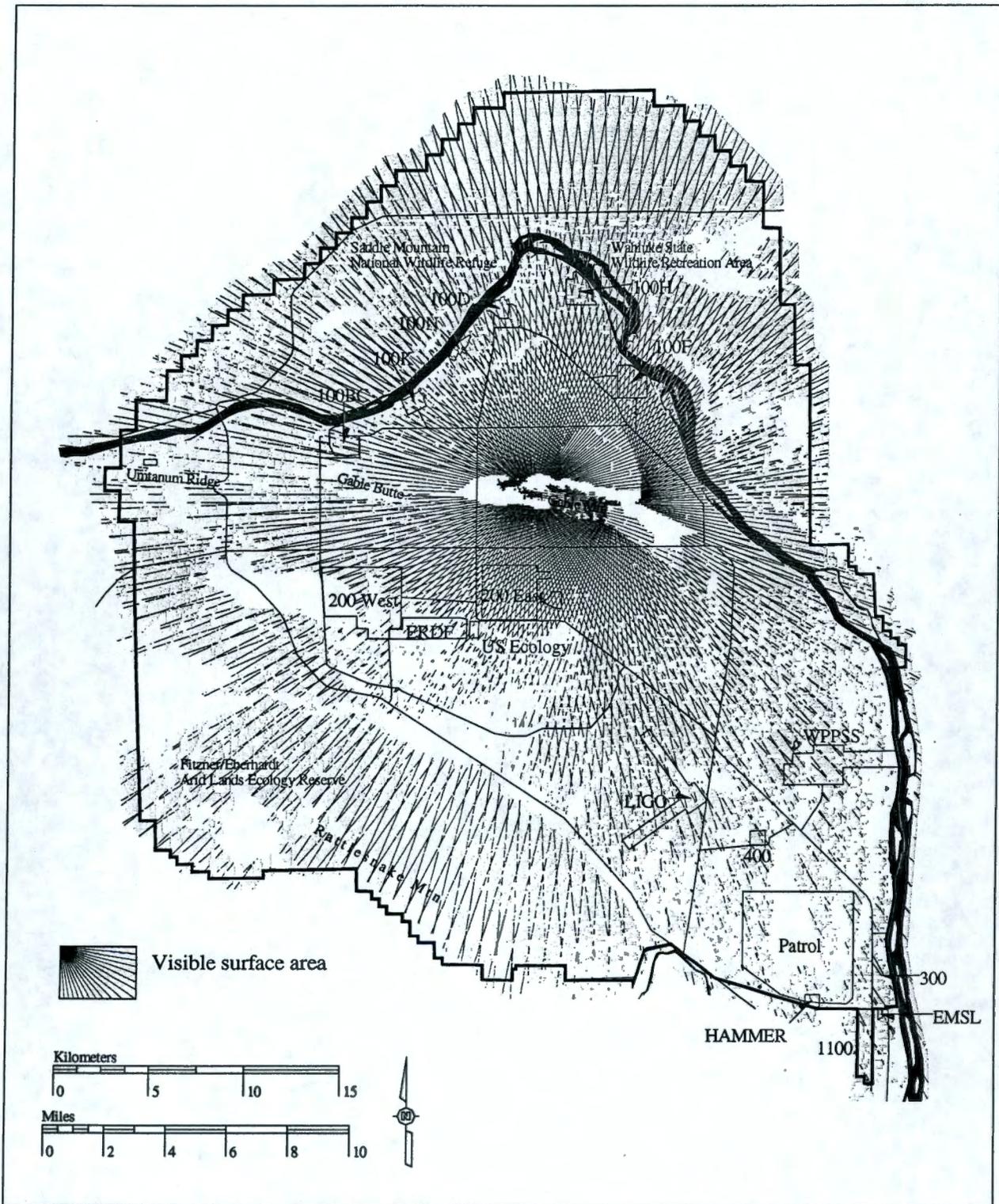
37 This EIS defines noise as "any undesirable or unwanted sound or audible disturbance that
38 interferes with normal activity." Typically, intrusive noise events are those that disrupt normal
39 human activity, especially verbal communication. Under certain circumstances, people are willing
40 to endure noise as a trade-off for accomplishing some meaningful activity or because certain
41 noises represent tangible evidence of progress. In the context of transportation systems, a certain
42 amount of noise also is usually considered tolerable.
43

44 **4.9.1 Public Health Implications**

45

46 Noise impacts on public health usually are analyzed in terms of a dose-response
47 relationship because noise effects are cumulative. Prolonged exposure to loud noises can impair
48 hearing. The impairment can be temporary or permanent, depending on intensity and duration of
49 the noise. Normally, hearing degeneration does not occur if the duration of the event is brief.
50 Off-property noise impacts are the sound-exposure levels that interfere with normal speech,
51 disrupt sleep, or produce secondary effects such as increased levels of stress among community
52 members.
53

2 **Figure 4-33. Viewshed from Gable Mountain.**



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1 **4.9.2 Hanford Site Sound Levels**

2
3 Most industrial facilities on the Hanford Site are located far enough away from the Site
4 boundary that noise levels at the boundary are not measurable or are barely distinguishable from
5 background noise levels. Modeling of environmental noises has been performed for commercial
6 reactors and traffic on SR 240 through the Hanford Site. These data are not concerned with
7 background levels of noise and are not reviewed here.
8

9 Two studies of environmental noise were performed at the Hanford Site. One study
10 reported environmental noise measurements taken in 1981 during Site characterization of the
11 Skagit/Hanford Nuclear Power Plant Site (Cushing 1995). The second consisted of a series of
12 Hanford Site characterization studies performed in 1987 that included measurement of
13 background environmental noise levels at five locations on the Hanford Site. Noise can be
14 disruptive to wildlife and studies have been performed to compile noise data in remote areas.
15

16 Recently, the potential impact of traffic noise resulting from Hanford Site activities has
17 been evaluated for a draft environmental impact statement (EIS) addressing the siting of a
18 proposed New Production Reactor (Cushing 1995). While the draft EIS did not include any new
19 baseline measurements, it did address the traffic component of noise and provides modeled
20 "baseline" measurements of traffic noise for the Hanford Site and adjacent communities. Baseline
21 noise estimates were determined for two locations: SR 24, leading from the Hanford Site west to
22 Yakima; and State Highway 240, south of the Site and west of Richland where maximum traffic
23 volume exists. Traffic volumes were predicted based on the presence of both operational and
24 construction work forces. Noise levels were expressed in Leq for one-hour periods in dBA at a
25 receptor located 15 m (49 ft) from the road. Adverse community responses would not be
26 expected at increases of 5 dBA over background noise levels.
27

28 To provide noise data for the Energy Northwest (formerly known as WPPSS) plants,
29 measurements of environmental noise were taken in June 1981 before the construction of the
30 Energy Northwest plants on the Hanford Site. Monitoring was conducted at 15 sites, showing
31 point noise levels reading ranging from 30 to 60.5 dBA. The corresponding values for more
32 isolated areas ranged from 30 to 38.8 dBA. Measurements taken in the vicinity of the sites where
33 Energy Northwest (formerly known as WPPSS) was constructing nuclear power plants ranged
34 from 50.6 to 64 dBA, reflecting operation of construction equipment. Measurements taken along
35 the Columbia River near the intake structures for WNP-2 were 47.7 and 52.1 dBA, compared to
36 more remote river noise levels of 45.9 dBA (measured about 4.8 km [3 mi] upstream of the intake
37 structures). Community noise levels from point measurements in North Richland (at Horn Rapids
38 Road and Stevens Road [Route 240]) were 60.5 dBA, which was largely attributed to traffic.
39

40 To support the Basalt Waste Isolation Project, background noise levels were determined at
41 five sites located within the Hanford Site. Noise levels are expressed as equivalent sound levels
42 for 24 hours (Leq-24). The average noise level for these five sites was 38.8 dBA on the dates
43 tested. The wind was identified as the primary contributor to background noise levels, with winds
44 exceeding 19 km/hr (12 mi/hr) significantly affecting noise levels. This study concluded that
45 background noise levels in undeveloped areas at the Hanford Site are generally in the range of
46 24 to 36 dBA (Cushing 1992). Periods of high wind, which normally occur in the spring, would
47 elevate background noise levels.
48

49 In addition to the project-driven studies described above, the Hanford Environmental
50 Health Foundation has monitored noise levels resulting from several routine operations performed
51 in the field at the Hanford Site. These included well drilling, pile driving, compressor operations,
52 and water-wagon operation. Occupational sources of noise propagated in the field from outdoor
53 activities ranged from 74.8 to 125 dBA (PNNL 1996a).
54

1 **4.10 Environmental Monitoring Programs**

2
3 Environmental surveillance at the Hanford Site consists of monitoring for potential
4 radiological and nonradiological constituents and includes monitoring of external radiation, air,
5 surface water, groundwater, soil, vegetation, wildlife, and regional food and farm products.
6 Monitoring is performed to ensure protection of human health and safety and is conducted in
7 compliance with DOE Order 5400.1, *General Environmental Protection Program* (DOE 1990a),
8 and DOE Order 5400.5, *Radiation Protection of the Public and the Environment* (DOE 1993a).
9 A detailed discussion of the Hanford Site environmental monitoring program is found in the
10 *Hanford Site Environmental Monitoring Plan* (DOE-RL 1991a), and monitoring data are presented
11 in annual reports, such as the *Hanford Site Environmental Report for Calendar Year 1995*
12 (PNNL 1996b).

13
14 The Hanford Environmental Health Foundation (HEHF) provides occupational health
15 services to Hanford personnel through health risk management and occupational health
16 monitoring. The HEHF's Health Risk Management Program is used to identify and analyze the
17 hazards that Hanford personnel face in the work environment and bring an awareness to worker
18 health and safety issues at Hanford. HEHF's occupational health services provide occupational
19 medicine and nursing, medical monitoring and surveillance, ergonomics assessment, exercise
20 physiology, case management, psychology and counseling, fitness for duty evaluations, health
21 education, infection control, immediate health care, industrial hygiene, and health, safety, and risk
22 assessments.

23 24 25 **4.11 Contamination**

26
27 Three operating areas of the Hanford Site (the 100, 200, and 300 Areas) are still included
28 on the EPA's National Priorities List (NPL), while the 1100 Area has been fully remediated and
29 removed from the EPA's NPL. Radioactive and hazardous materials have been disposed to the
30 ground throughout the period of active Hanford Site operations, resulting in extensive
31 contamination of the vadose zone and groundwater.

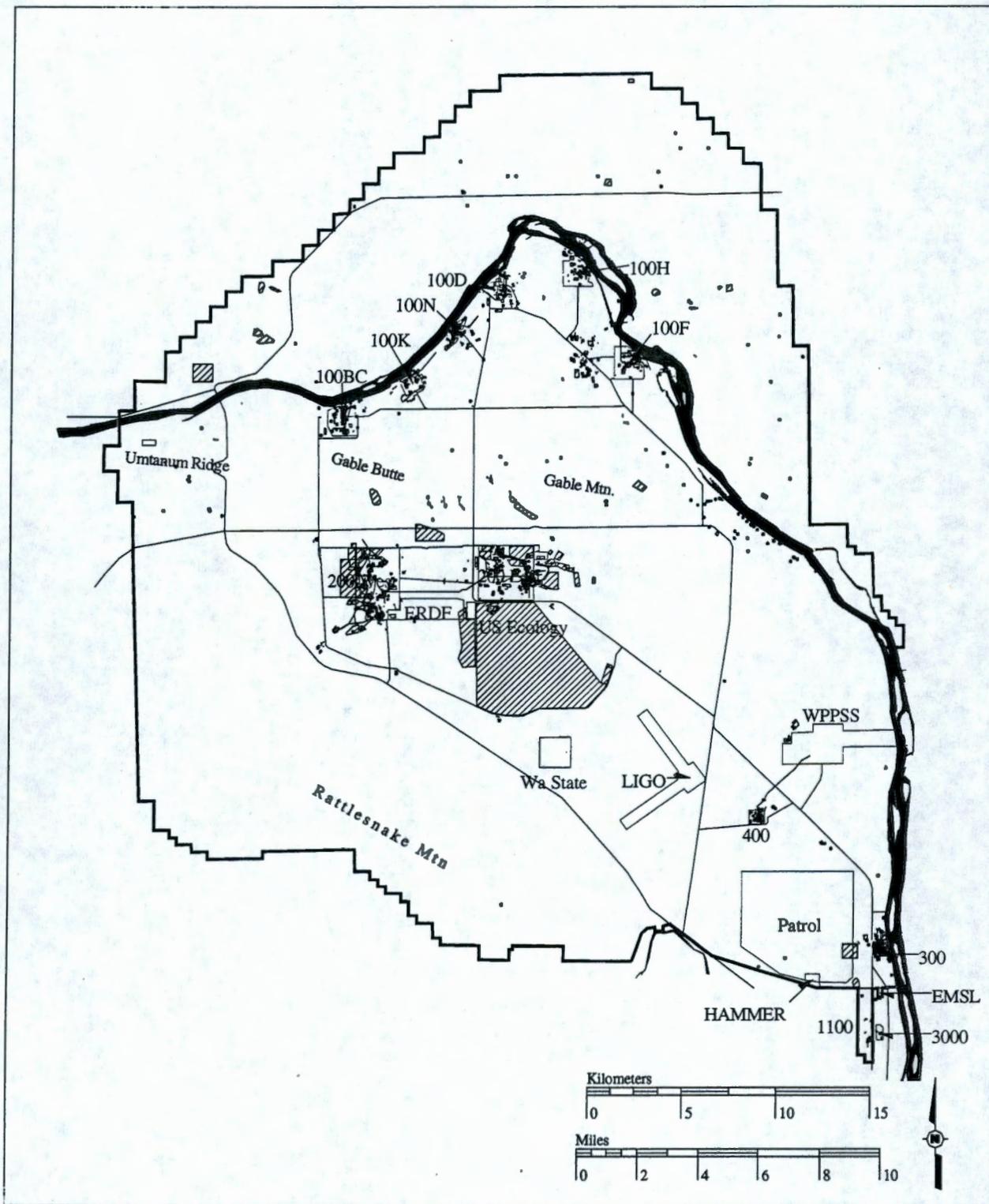
32
33 Under the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)
34 (Ecology et al. 1989), the more than 1,000 inactive waste disposal and unplanned release sites
35 were grouped into groundwater and source operable units, based on geographic proximity or
36 similarity of waste disposal history. In addition, a number of *Resource Conservation and Recovery*
37 *Act of 1976* (RCRA) treatment, storage, and/or disposal (TSD) units are included in the Tri-Party
38 Agreement, which will be closed or permitted to operate in accordance with the State of
39 Washington's "Dangerous Waste Regulations" (WAC 173-303). Some of these waste sites and
40 TSD units are sources of environmental contamination.

41
42 The DOE holds interim status for the operation of hazardous waste management facilities
43 by virtue of having submitted a RCRA Part A application to EPA on November 18, 1980. On
44 November 6, 1985, DOE submitted a RCRA Part B application to Ecology and the EPA Region 10
45 for the TSD of hazardous wastes at Hanford. Supplemental and revised RCRA applications have
46 been submitted to Ecology in accordance with the schedule established in the Tri-Party
47 Agreement. A final status permit covering several units at the Hanford Site was issued in
48 August 1994. This permit will be amended over a period of years to add additional interim status
49 TSD units.
50

1 Hanford surface waste sites, based on data from the Hanford Geographic Information
2 System (HGIS) and Waste Information Data System (WIDS) database, are shown in Figure 4-34.
3 Included is vadose zone contamination, primarily in the 100, 200, and 300 Areas. The vadose
4 zone contamination, while not necessarily occurring from all waste sites, is a result of the disposal
5 of wastes to surface disposal structures such as the following:
6

- 7 • **Tanks and vaults** – Used to store radioactive liquid wastes generated by uranium
8 and plutonium processing activities in the 200 Areas. Tanks include catch tanks,
9 settling tanks, and storage tanks. The catch tanks are generally associated with
10 diversion boxes and other transfer units and were designed to accept overflow and
11 spills; wastes collected in catch tanks were transferred to storage tanks. Settling
12 tanks were used to settle particulates in liquid wastes prior to transfer to cribs.
13 Storage tanks were used to collect and store large quantities of liquid wastes.
14 Storage tanks include single-shell tanks and double-shell tanks.
15
- 16 • **Vaults** – Typically are deep underground concrete structures that contain tanks as
17 well as associated pumps, valves, and agitators. Vaults do not hold wastes but
18 instead provide containment for other types of storage features and associated
19 plumbing.
20
- 21 • **Cribs and drains** – Were designed to percolate low-level radioactive process
22 waste into the ground without exposing the waste to the open air. Cribs and drain
23 fields are shallow excavations that were either backfilled with permeable material or
24 held open by wooden structures, both of which are covered with an impermeable
25 layer. Water flows directly into the backfilled material or covered open space and
26 percolates into the soil. French drains generally deliver waste water at a greater
27 depth (up to 12.2 m [40 ft]) and are constructed of steel or concrete pipes that are
28 either left open or filled with gravel.
29
- 30 • **Ponds, ditches, and trenches** – Were designed to percolate high volumes of
31 low-level liquid wastes into the soil. Ditches are long, unlined excavations used to
32 convey wastes to the ponds. Trenches are generally open, unlined, shallow
33 excavations used for disposal of low-liquid discharges, such as sludge, which has a
34 high salt content. Trenches were used for short periods and were deactivated
35 when the discharge rate exceeded the soil infiltration rate.
36
- 37 • **Burial grounds** – Were used for disposal of solid wastes. Although the burial
38 grounds received a variety of contaminated debris and solid wastes packed in
39 barrels and boxes, there is currently no evidence of vadose zone contamination
40 occurring from the disposal of solid wastes in burial grounds. Vadose
41 contamination typically occurs when there is a driving force for the contamination,
42 such as is found with the disposal of liquids.
43

1 **Figure 4-34. Hanford Surface Waste Sites (Past and**
 2 **Present).**
 3
 4



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1 **4.11.1 Hanford Groundwater Contamination**

2
3 There are a variety of contaminants present in the groundwater of the Hanford Site
4 (Figures 4-35 and 4-36 and Table 4-14). The extent of major radionuclides at levels above the
5 interim drinking water standards (DWSs) is shown in Figure 4-35. Tritium, iodine-129, technetium-
6 99, and strontium-90 were present at levels above EPA or State of Washington interim DWSs.
7 Uranium exceeded EPA's proposed maximum contaminant level (MCL). Minor radiological
8 contamination DWS included carbon-14 (in the 100-K Area), cesium-137, and plutonium (in the
9 200 East Area, near injection well 216-B-5). Derived concentration guide levels (DCGLs) were
10 exceeded for strontium-90 in the 100-K, 100-N, and 200 East Areas (near injection well 216-B-5),
11 and near the former Gable Mountain Pond. The DCGL for uranium was exceeded near U Plant.
12 The DCGL for tritium was exceeded in one well near cribs that received effluent from the
13 Plutonium-Uranium Extraction (PUREX) Plant, and in another well near waste management area
14 TX-TY. The DCGL for plutonium was exceeded in one well in the 200 East Area (near injection
15 well 216-B-5). Cobalt-60 levels exceeded the 100 pCi/L interim DWS in recent years but were
16 below the DWS in fiscal year 1998 (PNNL 1998).
17

18 The extent of major chemical constituents at levels above the primary MCLs is shown in
19 Figure 4-36. Nitrate, carbon tetrachloride, and trichloroethylene were the most widespread.
20 Chloroform, cis-1,2-dichloroethylene, cyanide, fluoride, chromium, and other metals also were
21 present at levels above their MCLs. Tetrachloroethylene exceeded its 5 µg/L MCL in the 300 Area
22 in fiscal year 1998 for the first time since the 1980s (PNNL 1998).
23

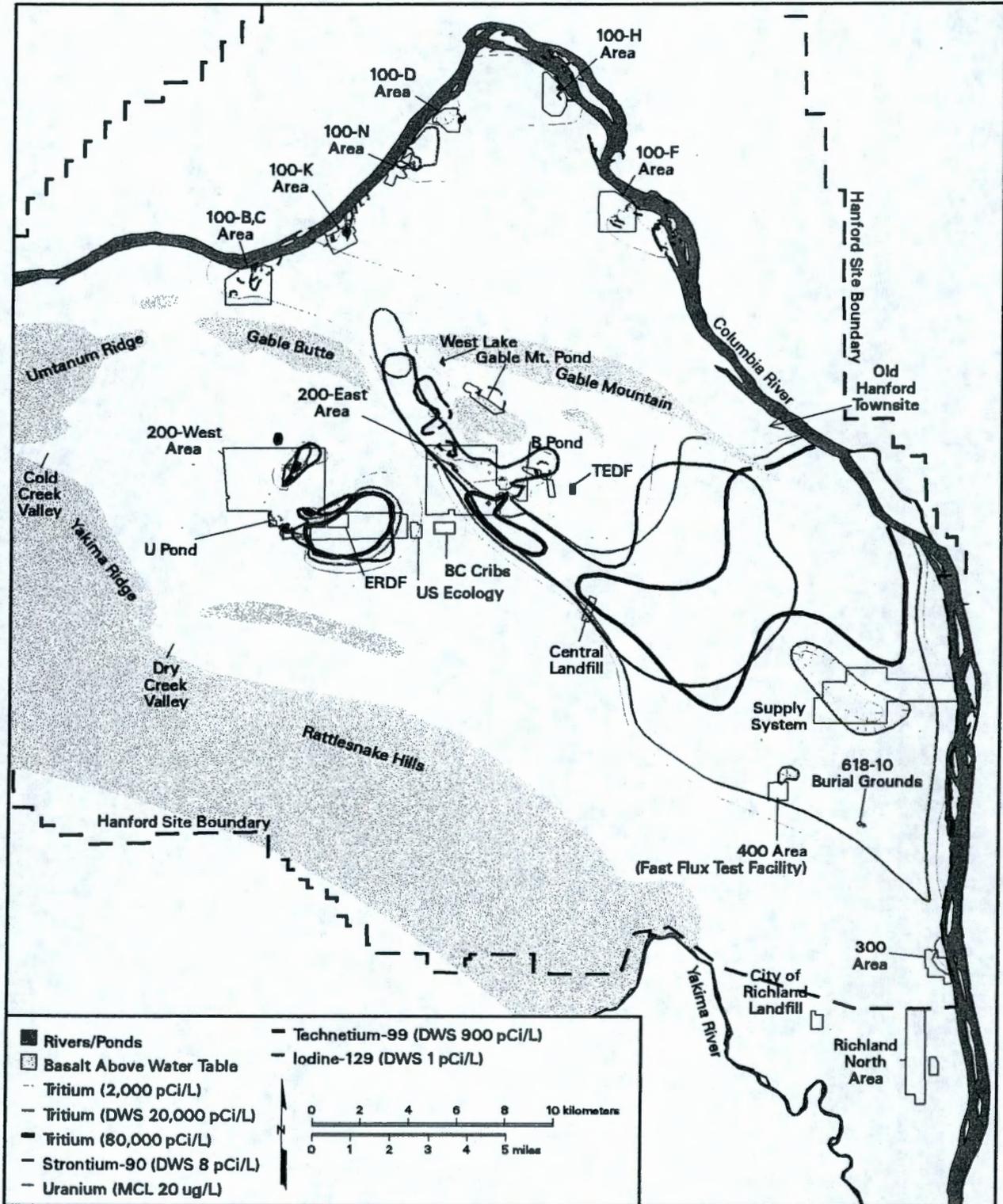
24 The area of Hanford contaminant plumes with concentrations exceeding an MCL or DWS
25 was estimated to be approximately 245 million m² (95 mi²) in fiscal year 1998. This equates to a
26 volume of approximately 1.4 billion m³, which is the same as fiscal year 1997. The volume
27 estimate has a high uncertainty because of a lack of knowledge of the vertical extent of
28 contaminant plumes. Plume thickness is estimated to be 20 m (66 ft), except in the 100 and
29 300 Areas and the North Richland area, where the plume is estimated to be 5 m (16 ft). The
30 porosity of the aquifer is not well-characterized; for the purpose of the calculation, the porosity was
31 assumed to be 30 percent. This estimate does not include water in the vadose zone.
32

33 Tritium, iodine-129, and nitrate plumes originating in the Central Plateau are quite
34 widespread, reaching the Columbia River to the east. Other contaminants are not as widespread
35 but exist in the groundwater at many different locations. Examples of these contaminants include
36 strontium-90, uranium, technetium-99, and chromium. Contaminant plume migration is affected in
37 part by the degree to which individual contaminants are mobile in groundwater and in part on
38 hydrogeologic conditions. Natural groundwater flow at the Hanford Site has been altered in some
39 areas due to past Hanford Site operations; this alteration is due in large part to groundwater
40 mounds that were created by extensive artificial recharge at some wastewater disposal facilities.
41 Although these groundwater mounds are dissipating, groundwater flow patterns are still affected
42 by past wastewater discharges on the Hanford Site
43

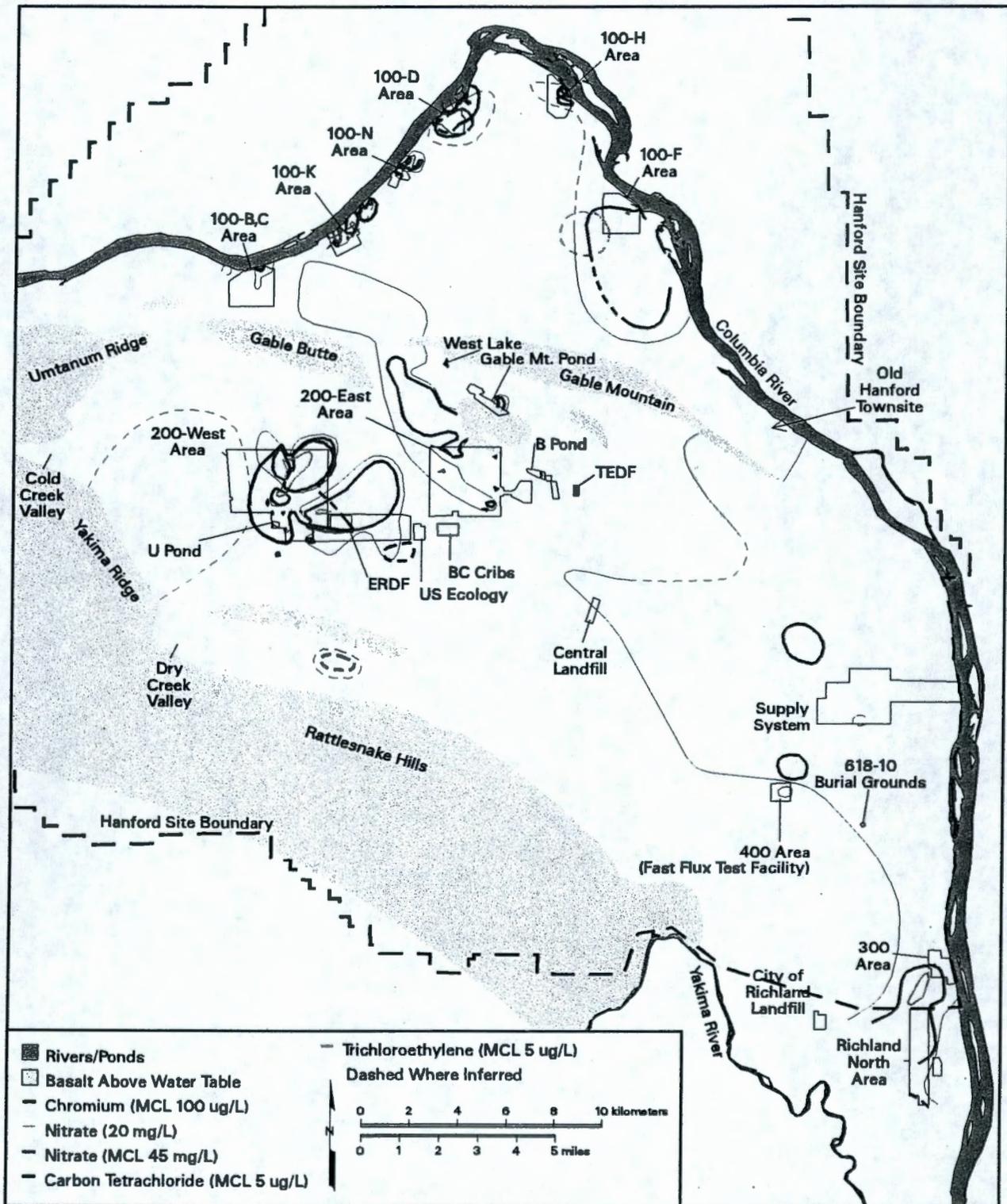
44 **.4.11.1.1 Groundwater Ingestion Dose and Risk Estimates.** Results of groundwater
45 monitoring are compared to the DWSs for individual radiological constituents (see Table 5-14).
46 These interim DWSs use the methodology set out in 40 CFR 141, 40 CFR 142, and 40 CFR 143
47 to estimate the concentration in water that could result in a potential radiological dose of
48 4 mrem/yr from consumption of each individual constituent. Similarly, DCGLs provide estimates of
49 activities that could result in a 100 mrem/yr dose, as defined in DOE Order 5400.5. However, the
50 potential dose is actually the sum of the doses from the individual constituents. An estimate of this
51 cumulative dose, which could result from consumption of groundwater from different onsite
52 locations, can be calculated from the extent of contamination.
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Figure 4-35. Distribution of Radionuclides in Groundwater within the Hanford Site (PNNL 1998).



1 **Figure 4-36. Distribution of Hazardous Chemicals of**
 2 **Concern in Groundwater within the Hanford Site (PNNL**
 3 **1998).**
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**Table 4-14. Detected Concentrations Greater Than Drinking Water Standards:
1995 Groundwater Sampling Rounds (adapted from PNL 1995). (2 pages)**

Area Name	Plume Constituent	Units	Maximum Plume Concentration	EPA DWS	Washington Water Quality Standard
100-B/C	Chromium	ug/L	>50.0	100	50
	Strontium-90	pCi/L	56.7	8	8
	Tritium	pCi/L	28,000	20,000	20,000
100-D/DR	Chromium	ug/L	1,360	100	50
	Nitrate	mg/L	205	45	45
	Strontium-90	pCi/L	44.0	8	8
	Tritium	pCi/L	69,000	20,000	20,000
100-F	Chromium	ug/L	82.4	100	50
	Nitrate	mg/L	110.0	45	45
	Uranium	ug/L	133.0	20	20
	Strontium-90	pCi/L	20.5	8	8
	Tritium	pCi/L	98,300	20,000	20,000
	Trichloroethylene	ug/L	27.0	5	N/A
100-H	Chromium	ug/L	300.0	100	50
	Nitrate	mg/L	730.0	45	45
	Strontium-90	pCi/L	28.0	8	8
100-KE/KW	Chromium	ug/L	210.0	100	50
	Nitrate	mg/L	110.0	45	45
	Strontium-90	pCi/L	803.0	8	8
	Tritium	pCi/L	1,040,000	20,000	20,000
	Trichloroethylene	ug/L	20.0	5	N/A
100-N	Chromium	ug/L	200.0	100	50
	Cobalt-60	pCi/L	732.0	100	N/A
	Nitrate	mg/L	65	45	45
	Strontium-90	pCi/L	4,030	8	8
	Tritium	pCi/L	74,200	20,000	20,000
200 East	Chromium	ug/L	73.0	100	50
	Nitrate	mg/L	120.0	45	45
	Cyanide	ug/L	39.5	200	200
	Strontium-90	pCi/L	9,740	8	8
	Cesium-137	pCi/L	2,310	10	10
	Tritium	pCi/L	3,370,000	20,000	20,000
	Cobalt-60	pCi/L	40.1	100	N/A
	Iodine-129	pCi/L	11.8	1	1
	Plutonium-239/240	pCi/L	2,670	1	N/A
	Technetium-99	pCi/L	3,700	900	900
	Uranium	ug/L	64.3	20	20

Table 4-14. Detected Concentrations Greater Than Drinking Water Standards: 1995 Groundwater Sampling Rounds (adapted from PNL 1995). (2 pages)

Area Name	Plume Constituent	Units	Maximum Plume Concentration	EPA DWS	Washington Water Quality Standard
200 West	Cesium-137	pCi/L	21.8	10	10
	Cobalt-60	pCi/L	13.2	100	N/A
	Cyanide	ug/L	20.0	200	200
	Chromium	ug/L	500.0	100	50
	Nitrate	mg/L	1,700	45	45
	Fluoride	mg/L	5.1	4	4
	Tritium	pCi/L	2,400,000	20,000	20,000
	Iodine-129	pCi/L	86.1	1	1
	Technetium-99	pCi/L	23,700	900	900
	Uranium	ug/L	2,720	20	20
	Carbon tetrachloride	ug/L	5,200	5	0.3
	Chloroform	ug/L	107.0	100	7
	Strontium-90	pCi/L	14.5	8	8
	Trichloroethylene	ug/L	44	5	N/A
300 Area	Chromium	ug/L	<100.0	100	50
	Uranium	ug/L	150	20	20
	Trichloroethylene	ug/L	6.1	5	N/A
600 Area (All Other Areas)	Cyanide	ug/L	110.0	200	200
	Chromium	ug/L	>100.0	100	50
	Nitrate	mg/L	100	45	45
	Strontium-90	pCi/L	994.0	8	8
	Technetium-99	pCi/L	4,310	900	900
	Tritium	pCi/L	257,000	20,000	20,000
	Trichloroethylene	ug/L	25	5	N/A

DWS = drinking water standard
 EPA = U.S. Environmental Protection Agency
 ug/L = 1 part per billion (ppb) or microgram per liter
 mg/L = 1 part per million (ppm) or milligram per liter
 pCi/L = picocurie per liter
 N/A = not applicable

Figure 4-37 shows the cumulative dose estimates from ingestion of groundwater from the unconfined aquifer system on the Hanford Site. These estimates were made by summing the interpolated carbon-14, strontium-90, technetium-99, iodine-129, cesium-137, plutonium, tritium, and uranium activities in groundwater. The automatic interpolation process sometimes resulted in peak grid values that were lower than the measured maximum values because it averaged in other lower values. In these cases, the value at the grid node closest to the measured peak value was increased to match the measured peak. Factors to convert activities to ingestion dose equivalents were taken from DOE Order 5400.5. The dose presented in Figure 4-37 represents the cumulative dose equivalent from all major radionuclides in Hanford Site groundwater.

The dose estimates presented in Figure 4-37 show that areas above the 100 mrem/yr dose standard are restricted to localized parts of the 100-K, 100-N, and 200 Areas. Areas above 4 mrem/yr are more restricted than the area above the interim DWS for individual constituents

1 because the dose map used more recent conversion factors than those used in calculating the
2 interim DWSs. Dose estimates for portions of the 100, 200, 300, and 600 Areas exceed
3 4 mrem/yr.
4

5 Figure 4-38 illustrates the estimated lifetime incremental cancer risk that would be
6 experienced by a person drinking water contaminated with chemicals and radionuclides at
7 concentrations that have been measured in groundwater across the Hanford Site. Cancer-risk
8 estimates were made by summing interpolated groundwater concentrations of the radionuclides
9 listed above plus carbon tetrachloride, chloroform, trichloroethylene, cis-1,2-dichloroethylene,
10 nitrate, and hexavalent chromium. The calculation assumes that a person weighing 70 kg
11 (154 lbs) consumes 2 L (0.5 gal) of groundwater every day for 30 years (DOE/RL-91-45, Rev. 3;
12 IRIS 1997). Cancer risks exceeding 0.0001 are present in portions of the 100, 200, 300, and
13 600 Areas, and this contour closely resembles the cumulative dose map (see Figure 4-37). An
14 additional area of cancer risk >0.0001 is observed in the 200 West Area, a result of the carbon
15 tetrachloride plume.
16

17 Figure 4-39 shows the estimated hazard quotient that would be experienced by an individual
18 drinking water contaminated with chemicals at concentrations that have been measured in
19 groundwater across the Hanford Site. The hazard quotient relates the potential human health
20 hazards associated with exposure to noncarcinogenic substances or carcinogenic substances with
21 systemic toxicities other than cancer (in Hanford Site groundwater, these include nitrate,
22 hexavalent chromium, uranium, and strontium). The calculation assumes that a person weighing
23 70 kg (154 lbs) consumes 2 L (0.5 gal) of groundwater every day for 30 years (DOE/RL-91-45,
24 Rev. 3; IRIS 1997). The only part of the Hanford Site with a >5 hazard quotient is a small portion
25 of the 200 West Area. Hazard quotients >0.3 are present in all of the operational areas and in
26 parts of the 600 Area, primarily those areas with nitrate contamination.
27

28 **4.11.2 Columbia River Contamination**

29

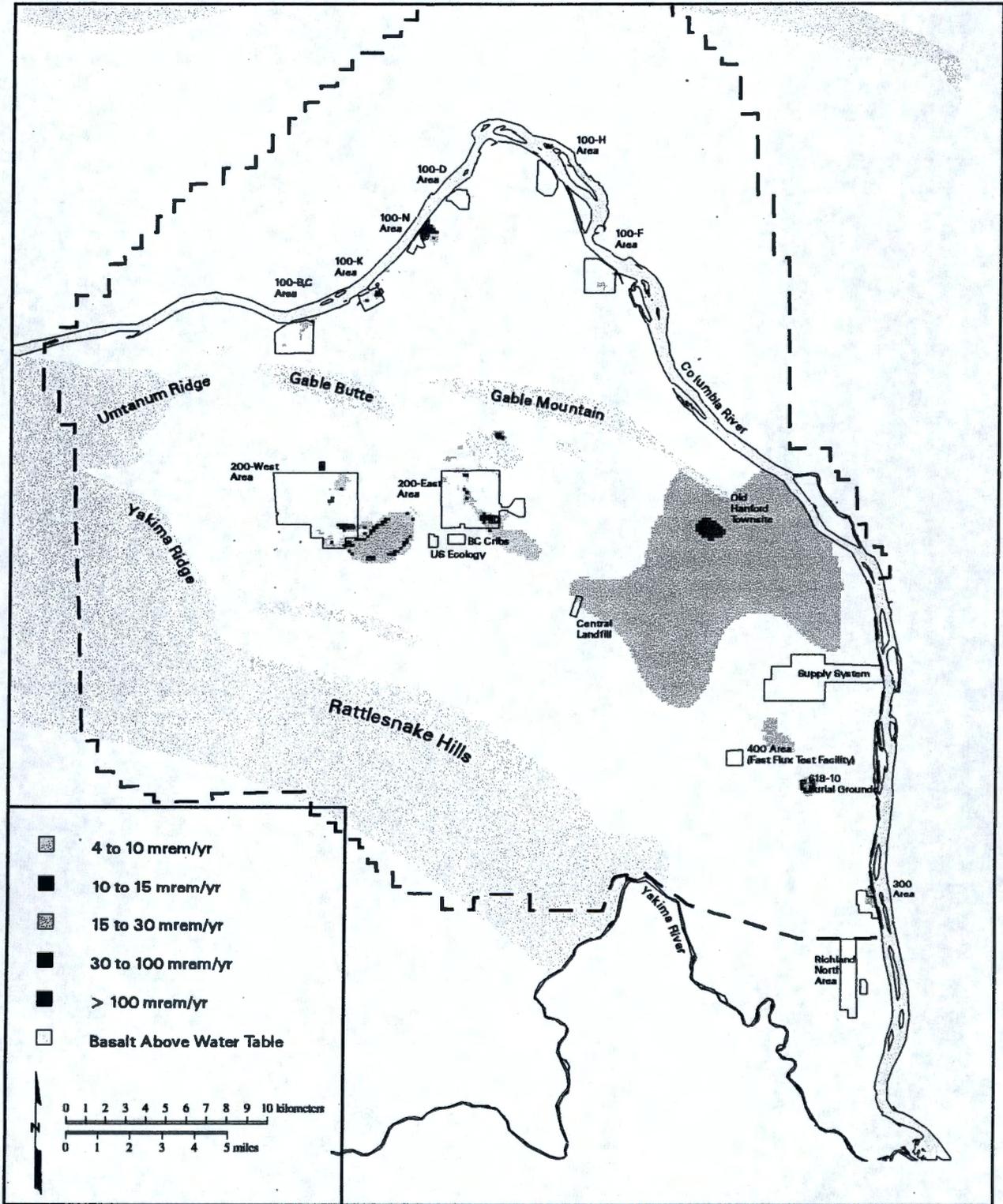
30 The Columbia River has received radiological and chemical contamination as a result of past
31 operations at the Hanford Site. Columbia River water that was used to cool the Hanford Site
32 nuclear production reactors subsequently was contaminated with chemical and radiological
33 constituents. The contaminated water entered the Columbia River primarily through direct effluent
34 discharge. In addition to direct discharges of contaminated cooling water, the Columbia River
35 received and continues to receive contaminants indirectly through soil column waste disposal
36 units, leaks from pipelines, and possibly leaks from tanks that are carried by the groundwater and
37 discharged through springs and seeps along the shoreline (DOE 1993a).
38

39 Sediments in the Columbia River contain low levels of Hanford radionuclides (i.e., cobalt-60,
40 uranium-238, and europium-154) and metals; and radionuclides from nuclear weapons testing
41 fallout, which collect in slack water habitats. Analyses of sediments showed detectable, though
42 low, levels of metals in Columbia River sediments. Chromium concentrations in sediment along
43 the Hanford Reach appeared to be slightly elevated when compared to upstream samples
44 (PNNL 1996c).
45

46 Contaminated areas within the Columbia River are generally located in slack water areas,
47 such as sloughs and portions of the islands. These contaminated areas have been identified by
48 aerial gamma-ray surveys. Riverbed sediments and floodplain soils of the Hanford Reach
49 constitute a sink for many of the pollutants released to the environment by past Hanford
50 operations. Shoreline activities that affect the flow of the Columbia River could remobilize
51 contaminants entombed within river sediments.

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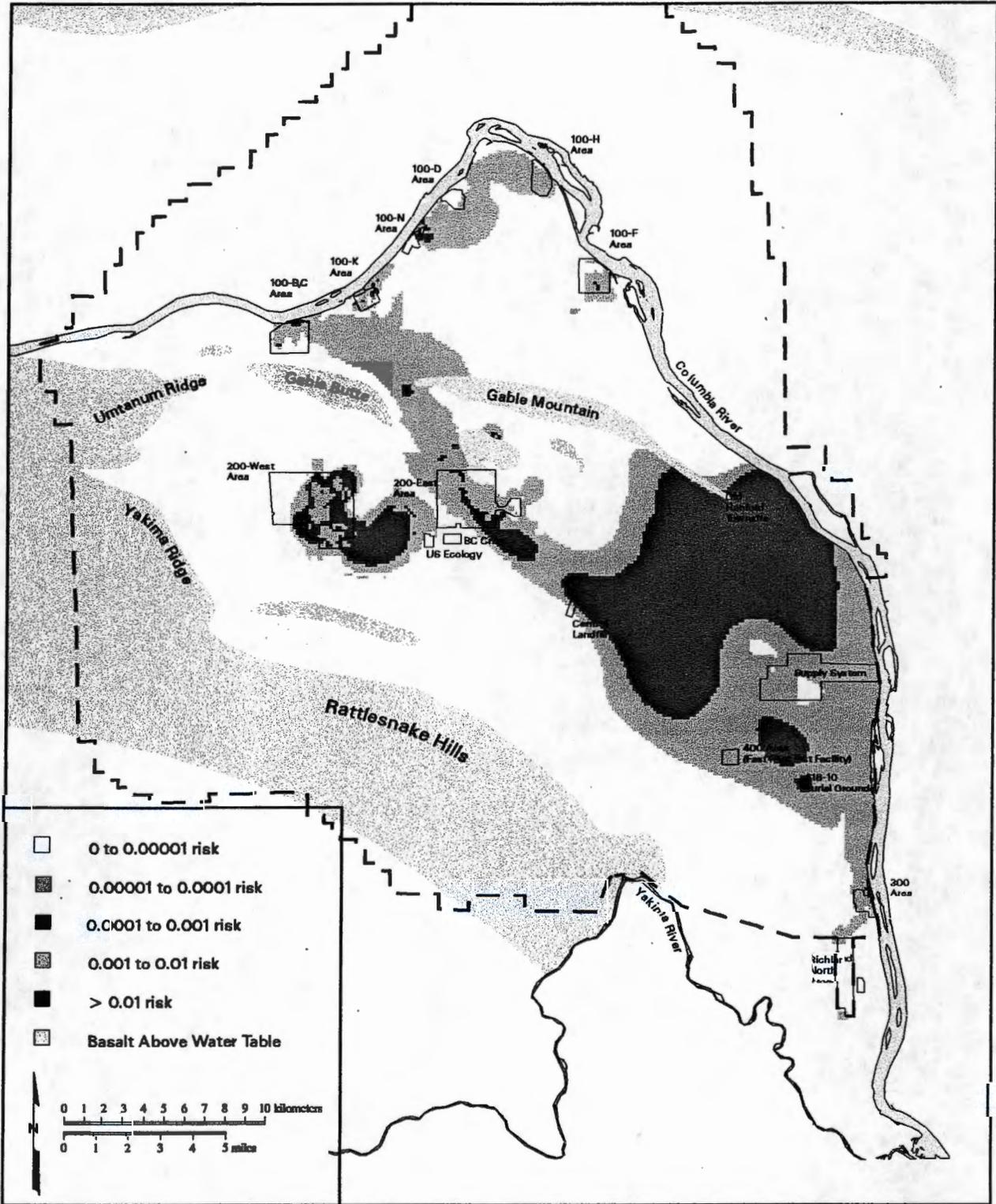
Figure 4-37. Potential Dose Estimates from Ingestion of Groundwater, Fiscal Year 1998 (PNNL 1998).



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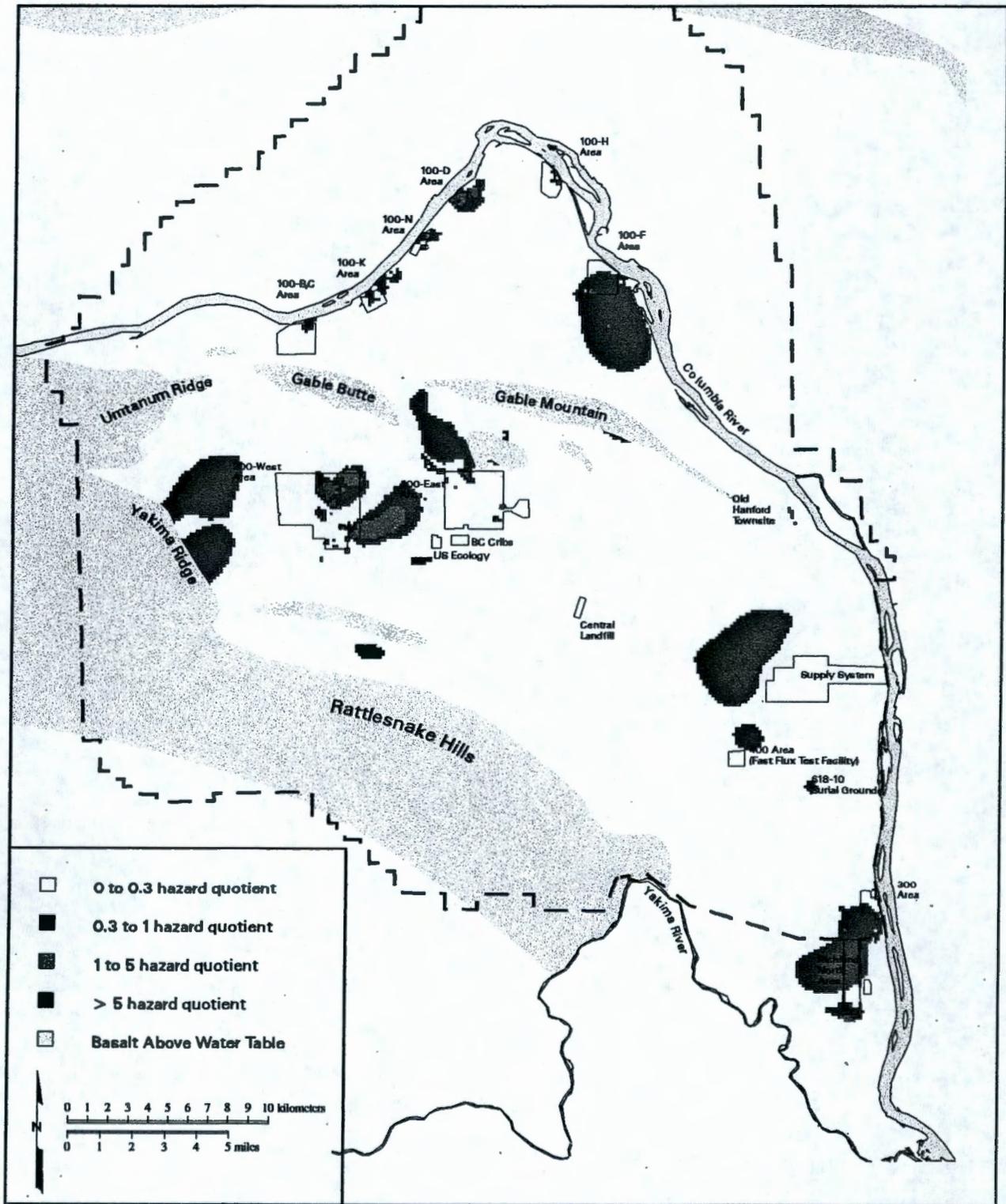
Figure 4-38. Potential Cancer Risk Estimates from Ingestion of Groundwater, Fiscal Year 1998 (PNNL 1998).



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Figure 4-39. Potential Hazard Quotient Estimates from Ingestion of Groundwater, Fiscal Year 1998 (PNNL 1998).



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1
2 River water used for cooling flowed through the Hanford reactor to the Columbia River,
3 carrying nuclear fission products and neutron-activated stellites (i.e., cobalt-60 particles). The
4 extent and amount of discrete cobalt-60 particles in the river have never been thoroughly
5 investigated and the actual amount of neutron-activated material transported to the Columbia
6 River is not known. Based on Stokes Law and the physical properties of sand and stellite
7 (Sula 1980; Cooper 1995), cobalt-60 particles (stellite) entrained into the river bedload have
8 preferentially settled in areas dominated by sand-size grains. The sandy areas of the Hanford
9 Reach have never been thoroughly examined for the presence of radionuclides. For example, the
10 sandy portion of D Island has not received a detailed survey for discrete radioactive particles
11 (WDOH 1996). Randomly placed surveys have been conducted, but the deposition of cobalt-60
12 particles by the Columbia River may not be a random process, and use of a random sampling
13 pattern may actually underestimate the concentration of cobalt-60 particles in the Columbia River
14 shoreline.

15
16 Due to shielding by soil, water, vegetation, and air (as well as the motion of the detector),
17 aerial gamma-ray surveys lack the sensitivity and resolution required to aid in the determination of
18 concentration of cobalt-60 particles. The non-random distribution of the cobalt-60 particles into
19 discrete areas and the presence of water within the detector's "field of view" (Sula 1980) further
20 reduces the utility of aerial gamma-ray surveys in determining the potential for cobalt-60 particles.

21 22 **4.11.3 Soil Contamination**

23
24 The 100 Areas include nine retired plutonium production reactors, effluent lines from each
25 reactor complex, 33 surplus facilities, more than 200 WIDS database past-practice waste sites,
26 and six TSD units. Extensive contamination exists in some areas of surface soils, subsurface
27 soils, and groundwater (EPA 1995a). Strontium-90, tritium, nitrate, and chromium are detected at
28 many of the 100 Area operable units.

29
30 The Central Plateau has been used for fuel reprocessing, waste management, and disposal
31 activities and is the most extensively contaminated area at the Hanford Site. More than 400 WIDS
32 database past-practice waste sites, 13 TSD units, and numerous groundwater contaminant
33 plumes occur in the 200 Areas. This area is the site of the Hanford Central Waste Complex and
34 the Tank Waste Remediation System facilities, which support present and future Hanford waste
35 management activities (EPA 1995a). There have been known releases from the Central Waste
36 Complex to the soil column. Contaminants include extensive groundwater plumes of
37 technetium-99, iodine-129, nitrate, tritium, uranium-238, and chlorinated hydrocarbons (e.g.,
38 carbon tetrachloride, chloroform, and trichloroethylene). Carbon tetrachloride in particular poses a
39 complex remediation problem; it is estimated that about 580 to 920 metric tons (640 to 1,014 tons)
40 of carbon tetrachloride have been disposed to the vadose zone where it exists in a vapor phase
41 above the water table, a liquid phase above and below the water table, and as a solute within the
42 water.

43
44 The 600 Area presents a diverse range of existing contamination. Parts of the 600 Area
45 vadose zone are essentially uncontaminated, while nearby operating areas, such as the 300 Area,
46 present significant environmental remediation challenges. Several small, isolated surface waste
47 sites have been remediated as expedited response actions under the *Comprehensive*
48 *Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). Extensive
49 groundwater contamination (i.e., nitrate, tritium, technetium-99, and iodine-129) occurs in the 600
50 Area.

51
52 Although some information on soil contamination is available, DOE recognizes that a
53 comprehensive and integrated vadose zone characterization effort is needed at the Hanford Site
54 to adequately assess risk during waste retrieval and treatment activities, and eventual closure of

1 the 200 Area tank farms. Therefore, in April 1996, DOE brought together Hanford's Vadose Zone
2 Expert Panel, comprised on representatives from state government, national laboratories, and the
3 private sector. The Panel was convened primarily to assess how cesium-137 reached depths of
4 39 m (130 ft) in the vadose zone under the SX tank farm. An integrated vadose zone program
5 plan for the entire Hanford Site is under development (DOE-RL 1998). This project will account
6 for the entire waste inventory on the Hanford Site. Better understanding of vadose zone transport
7 mechanisms may require land-use restrictions where soil contamination is left at depth after
8 remediation.

9 10 **4.11.4 Hanford Site Protective Safety Buffer Zones**

11
12 Existing and planned waste disposal sites, waste processing facilities, and hazardous or
13 radiological materials storage facilities are found throughout the Hanford Site. To protect the
14 public from routine or accidental releases of radiological contaminants and/or hazardous materials,
15 protective measures for waste remediation, processing, and disposal facilities are required by
16 DOE Order 420.1 Facility Safety, DOE Order 151.1, *Comprehensive Emergency Management*
17 *System* (DOE 1996f), and Occupational Safety and Health Administration (OSHA) regulations
18 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response (Site Safety and
19 Control Plan)," 29 CFR 1910.119, "Process Safety Management (PSM) Rule" the PSM
20 complement, EPA's Risk Management Planning (RMP) under the Clean Air Act, 40 CFR 68.10(a),
21 and WAC 246-247. These buffer zones limit public exposure to radiological and hazardous
22 chemicals from routine operations and accidents. A methodology that used the air dispersion
23 model GXQ with 95-percent meteorological conditions based on the Nuclear Regulatory
24 Commission's Regulatory Guide 1.145 was developed to determine the location, size, shape, and
25 characteristics of the buffer zones needed for the Hanford Site, using existing safety analysis
26 reports, hazard assessments, and emergency planning zone studies. This methodology allows
27 decision makers to restrict potential land uses in areas where hazardous or radioactive material
28 handling could pose an unacceptable risk to human health. Actual DOE facility siting decisions
29 would be made with site-specific wind data at 99.5-percent meteorological conditions.

30
31 Buffer zones necessary to protect human health and safety in potential accidents are divided
32 into two main components — an inner exclusive-use zone (EUZ) and an emergency planning zone
33 (EPZ).

- 34
35 • DOE Orders 420.1 and 5480.23, along with the guidance document DOE-ST-3009,
36 require that a hazard analysis be developed as the basis for a conclusion that off-site
37 personnel are sufficiently protected from accidents at a nuclear facility. That conclusion
38 is to be reached through analysis showing that the estimated individual dose off-site from
39 any design basis accident or evaluation basis accident would be less than some guideline
40 amount. No guideline value has been issued by DOE, but a value of 25 rem committed
41 effective dose equivalent (CEDE) is frequently used by DOE's contractors in the absence
42 of a specified value (DNFSB/TECH-20). The EUZ is an area designated for operation
43 activities associated with a waste site or facility. In DOE O 420.1, Section 4.1.1.2, *Design*
44 *Requirements*, each DOE nuclear facility is required to "be sited and designed in such a
45 manner that gives adequate protection for the health and safety of the public and for
46 workers, including those at adjacent facilities, from the effects of potential facility
47 accidents involving the release of radioactive materials (DOE Order 420.1)."

48
49 Hanford contractors have interpreted this requirement as to maintain a public buffer zone
50 where 25 rem would not be exceeded in the event of an unmitigated low probability
51 accident (10^{-4} to 10^{-6}), where 5 rem would not be exceeded in the event of an unmitigated
52 medium probability accident (10^{-2} to 10^{-4}), or where 0.5 rem would not be exceeded in the
53 event of an unmitigated high probability accident (10^{-2} to 1) (WHC-85M00-JCVK-95008).
54 The EUZ is reserved for DOE or other hazardous operations with severely restricted

1 public access. This zone extends from the facility fence line to a distance at which
2 threats to the public from routine and accidental releases diminish to the point where
3 public access can be routinely allowed while ensuring the intent of DOE O 420.1 is
4 achieved. The EUZ is located inside the EPZ.

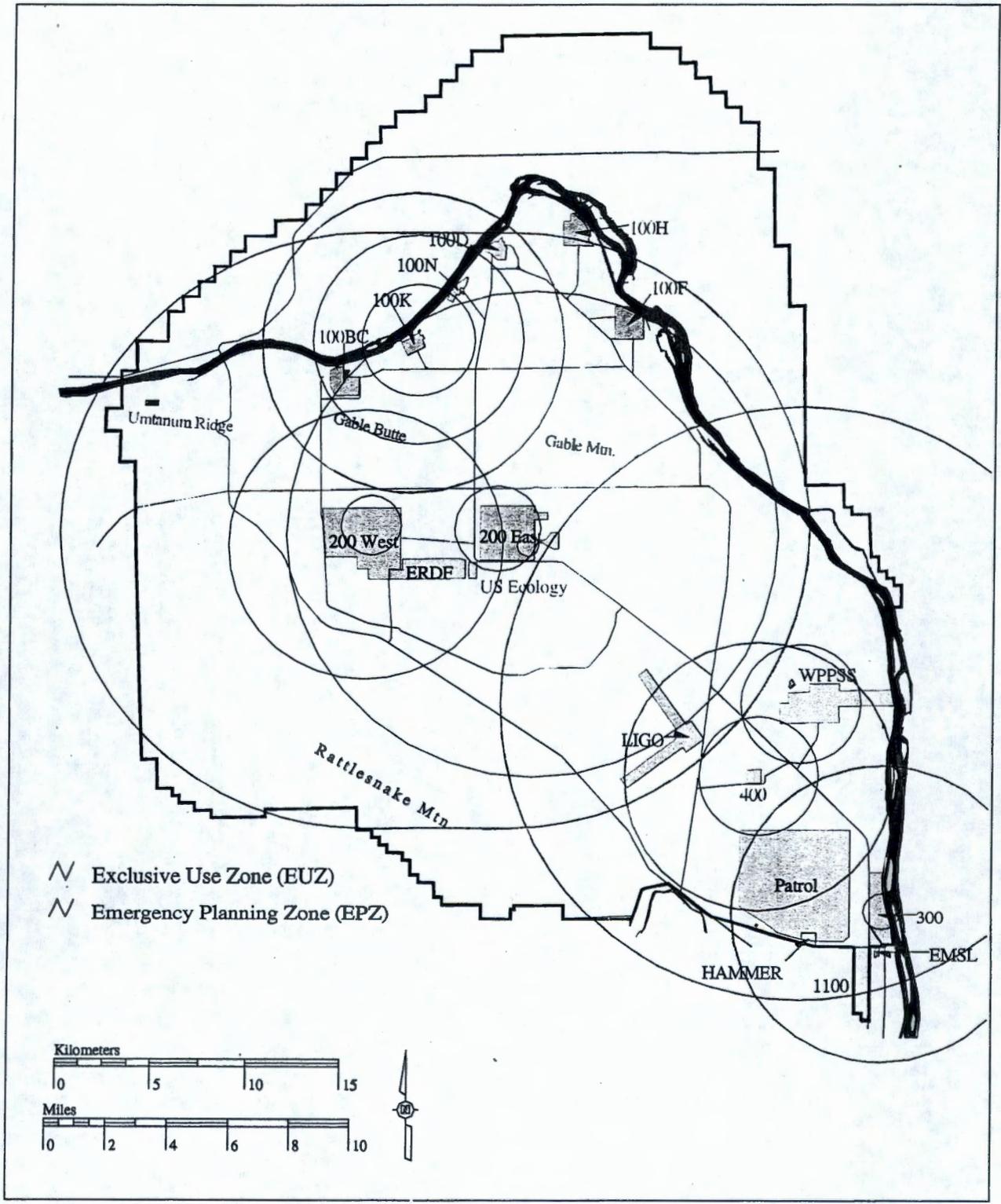
- 5
6 • The EPZ is an area surrounding a facility for which emergency planning and
7 preparedness efforts are carried out per DOE's *Comprehensive Emergency Management*
8 *System Order* (DOE Order 151.1) to ensure that prompt and effective actions can be
9 taken to minimize the impact to onsite personnel, public health and safety, and the
10 environment in the event of an operational emergency. The EPZ begins at the boundary
11 of the facility and ends at a distance for which special planning and preparedness efforts
12 are no longer required. Access restrictions are not required within an EPZ; however,
13 DOE would be responsible for ensuring adequate planning and preparedness efforts.

14
15 The protective buffer zones for the Hanford Site (Figure 4-40) were established using
16 boundaries calculated for individual limiting facilities (i.e., facilities with accidents of maximum
17 potential public health impact). Accidents initiated by sabotage are not applicable to EPZs.
18 Information about the limiting facilities, controlling contaminants, and credible accidents is
19 presented in Table 4-15.

20
21
22 In addition to the known risks (e.g., K-Basins could have the fuel elements removed in about
23 six years), RODs for the Hanford Site burial grounds are upcoming. It is very difficult to
24 adequately characterize heterogenous burial grounds created over 40 years ago (e.g., in a
25 surprise to everyone, the 618-4 burial ground had 1500 barrels of uranium fines packed in mineral
26 oil). In the spirit of DOE O 420.1's defense in depth policy, it is prudent for DOE to reserve land
27 for operational safety and/or remediation/stewardship buffer zones until the known risks and the
28 unknown risks are dispositioned. The boundaries provide a conservative buffer zone based on
29 risk and consequence management that is expected to be sufficient to address protective zone
30 needs for the multiple facilities present in each area on the Hanford Site. As the cleanup mission
31 progresses, the extent of these EUZ's is expected to shrink in size and eventually migrate inward
32 to the Central Plateau. This expectation is reflected in section 6.3.1, *Overall Policy*, number 5,
33 *Reduce exclusive use zone (EUZ) areas to maximize the amount of land available for alternate*
34 *uses while still protecting the public from inherently hazardous operations.*

35
36 In an effort to consider non-Hanford protective buffer zone requirements that could be
37 affected by Hanford Site public access and land-use decisions, the emergency preparedness
38 needs of Energy Northwest (formerly WPPSS) were considered. Under U.S. Nuclear Regulatory
39 Commission procedures, the Energy Northwest WNP-2 Reactor requires a 16-km (10-mi) EPZ
40 and a 1.9-km (1.2-mi) EUZ.

2 **Figure 4-40. Protective Safety Buffer Zones.**



BHLrpp 04/2296 clup/sar1.aml Database: 21-OCT-1998

Table 4-15. Protective Safety Buffer Zones (Exclusive Use Zones and Emergency Planning Zones).

Limiting Facility	Coordinates WASP-X	Coordinates WASP-Y	EUZ Boundary (m)	Credible Accident	Controlling Contaminant	EPZ Boundary (m)	Limiting Accident	Controlling Contaminant
100-K Area								
K-Basin	569184.3	146717	3,000	Chlorine cylinder valve failure	Cl	8,100	Sabotage	Cl, Pu, Cs-137
			5,600	Fuel processing for dry storage	Cs-137			Sr-90, Am-241
200 West Area								
PFP	566474.3	135652.7	7,300	Seismic event with ventilation	Pu	16,100	Waste tank sabotage and PFP seismic accident	Pu, Am-241
Tank Farms	566777	136734.1	1,600	Single-shell tank hydrogen deflagration	Cs-137	16,100	Waste tank sabotage and PFP seismic accident	Pu, Am-241
200 East Area								
B Plant/WESF	573504.9	136548.1	2,300	Cross-contamination from K-3 to K-1 filter banks	Sr-90, Cs-137	16,100	Waste tank sabotage	Pu, Am-241
Tank Farms	575422.2	136203.9	13,150	Double-shell tank filter blowout	Cs-137	16,100	Waste tank sabotage	Pu, Am-241
Limiting Proposed Facility - Tank Waste Vitrification Plant	575118.1	135636.9	600	Earthquake	Am-241	16,100	Waste tank sabotage	Pu, Am-241
300 Area								
324 Bldg. B-Cell	594247.4	115784.7	1,000	Earthquake 324 Bldg. w/o B-cell upset	Sr-90		(315 Bldg. accident dominates)	
315 Bldg.	594480.3	115761.7		(324 Bldg. accident dominates)		8,100	1,920 lbs. chlorine incident in the 315 Bldg.	Cl
400 Area								
FFTF	587604.9	123117.5	3,200	Sodium Storage Safety Class 2	Sodium hydroxide	7,300	Sodium sabotage	Sodium hydroxide

^a If K Basin fuel is not stable enough to move to the 200 Area before processing for dry storage, this larger EUZ may be needed.

^b The 324 B-cell accident dominated the credible ($>10^{-6}$ probability) accident calculations for the 300 Area EUZ; the 315 Building chlorine accident dominated the incredible ($<10^{-6}$ probability) accident calculations for the 300 Area EPZ.

EPZ = emergency planning zone

EUZ = exclusive use zone

FFTF = Fast Flux Test Facility

PFP = Plutonium Finishing Plant

WESF = Waste Encapsulation and Storage Facility

1
2 Within portions of the EUZ, certain types of public access would be restricted, while other
3 types of public access within that same area might be acceptable. Six different types of public
4 access have been defined for the EUZ (WHC 85M00-JCVK-95008). These types of access are
5 presented below:

- 6
7 • **Very Limited Access** -- Very limited access, such as passing through on
8 transportation corridors. Special arrangements would be required to leave the
9 designated access point. The evacuation time for this type of access would be no more
10 than 30 minutes. The maximum amount of time the maximally exposed individual
11 (MEI)¹ would spend in this area is estimated to be about 100 hr/yr.
12
13 • **Restricted Routine Access** -- This type of access area would include activities such
14 as industrial and commercial usage of a specifically designated area. It could also
15 include short special interest uses, such as short nature trails. All users of the area
16 must have ready access to transportation to facilitate a rapid evacuation. Evacuation
17 time for this type of access would be no more than 1 hour. The maximum amount of
18 time the MEI would spend in this area is estimated to be about 3,000 hr/yr.
19
20 • **Restricted Short-Term Access** -- This type of access may include locations adjacent
21 to transportation corridors. Public access might involve short stops to view sights or
22 engage in short duration activities. Access to areas more than 0.4 km (0.25 mi) from a
23 designated access point would be prohibited. The evacuation time for this type of
24 access would be no more than 1.5 hours. The maximum amount of time the MEI would
25 spend in this area is estimated to be about 200 hr/yr.
26
27 • **Moderately Restricted Periodic Access** -- This type of access would allow for
28 periodic activities, such as limited agricultural activities. Public access to this area
29 would tend to be more periodic and seasonal. No permanent residences, schools, or
30 hospitals would be allowed. The evacuation time for this type of access would be no
31 more than 2 hours. The maximum amount of time the MEI would spend in this area is
32 estimated to be about 3,000 hr/yr.
33
34 • **Moderately Restricted Occasional Access** -- This type of access area would allow
35 for more diverse activities for a longer, but controlled, periods of time than those
36 defined for the Moderately Restricted Periodic Access areas. For example, overnight
37 stays for short periods would be allowed. The evacuation time for this type of access
38 would be no more than 2.5 hours. The maximum amount of time the MEI would spend
39 in this area is estimated to be about 1,000 hr/yr.
40
41 • **Moderately Restricted Access** -- This type of access requires only minimal access
42 restrictions to ensure timely evacuation. This type of access would consider limited
43 residential-type usage of the area and could accommodate small schools and
44 commercial businesses. The evacuation time for this type of access would be
45 2.5 hours. The maximum amount of time the MEI would spend in this area is estimated
46 to be about 8,700 hr/yr.
47

48 In addition to DOE's desire for land to isolate from the public hazardous processes and
49 facilities that could produce a 25 rem radiological dose under an accident condition, the current
50 Hanford Site boundary has been used to identify and design safety class systems, structures
51 and components that are required to keep an accident from exceeding 500 mrem at the Site

¹ The maximally exposed individual (MEI) is defined as a hypothetical person who lives near the Hanford Site, who, by virtue of location and living habits, could receive the highest possible dose.

1 boundary. The current Site boundary is also the point-of-compliance for protection of the public
2 to assure that routine releases from all DOE activities are less than 100 mrem (DOE Order
3 5400.5), and that not more than 10 mrem is from airborne sources (40 CFR 61) or that not more
4 than 4 mrem are from groundwater sources (40 CFR 141). In addition to radiological accident
5 conditions, DOE also uses the current Hanford Site boundary to protect the public from potential
6 hazardous chemical accidents such as a chlorine gas leak. If the CLUP policies and
7 implementing procedures on EUZs are adopted in the ROD, then DOE expects to use DOE's
8 annual review of safety and environmental permitting documentation to be the basis for
9 implementing the EUZ policies (see Chapter 6).

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5.0 Environmental Consequences

This chapter describes the potential environmental consequences associated with the future land-use alternatives (including the No-Action Alternative) discussed in Chapter 3. These analyses focus on the environmental resource categories described in Chapter 4, "Affected Environment."

5.1 Analysis Approach

The alternatives developed by U.S. Department of Energy (DOE) and the cooperating agencies and consulting Tribal governments would allow a range of uses for Hanford Site lands. These land uses would have impacts to natural and cultural resources and could affect the socioeconomic environment in the region surrounding the Hanford Site. The potential environmental impacts of each land use would depend on the nature of the use, its location with respect to the resources, and the amount of land affected by the land use. Because the location and scale of specific future uses (e.g., a sand and gravel quarry or a metal fabrication plant) cannot be readily predicted, the impacts of these uses on specific resources cannot be accurately quantified. As described in Chapter 6, impacts of specific projects would be analyzed under the *National Environmental Policy Act of 1969* (NEPA); NEPA-integrated *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and *Resource Conservation and Recovery Act of 1976* (RCRA) documentation; and, where applicable, local *State Environmental Policy Act of 1971* (SEPA) processes as part of the implementation of the Hanford Comprehensive Land-Use Plan (CLUP).

Question #18 of the Council on Environmental Quality's (CEQ) "40 Most Asked Questions" (46 FR 18026) provides guidance regarding the uncertain effects of future actions (see text box, "CEQ's 40 Most Asked Questions: Uncertainties About Future Actions"). The analysis in this chapter was based on the CEQ guidance and focuses on identifying and describing the impacts of reasonably foreseeable future uses in light of land-use trends in the Hanford region. For some land uses, information was readily available on possible development plans. For example, the Wahluke 2000 Plan provided information on proposed agricultural development of the Wahluke Slope (Wahluke 2000 Committee 1992), and DOE's 1996 Strategic Plan (DOE-RL 1996b) provided information on proposed DOE development. For other uses, assumptions could be made on the basis of data available for trends in the region (e.g., industrial development in the Tri-Cities).

Although the analysis in this chapter is necessarily more qualitative than quantitative, it has been designed to provide adequate information to support the decisions to be made and to allow for meaningful comparison of the alternatives. The following sections describe the methods used to identify, describe, and compare the impacts of the alternatives.

CEQ's 40 Most Asked Questions: Uncertainties About Future Actions

18.Q. How should uncertainties about indirect effects of a proposal be addressed, for example, in case of disposal of Federal lands, when the identity or plans of future landowners is unknown?

A. The EIS must identify all the indirect effects that are known and make a good faith effort to explain the effects that are not known but are "reasonably foreseeable" Section 1508.8(b). In the example, if there is total uncertainty about the identity of future land owners or the nature of future land uses, then of course, the agency is not required to engage in speculation or contemplation about their future plans. But, in the ordinary course of business, people do make judgments based upon reasonably foreseeable occurrences. It will often be possible to consider the likely purchasers and the development trends in that area or similar areas in recent years; or the likelihood that the land will be used for an energy project, shopping center, subdivision, farm, or factory. The agency has the responsibility to make an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable or potential purchasers have made themselves known. The agency cannot ignore these uncertain but probable effects of its decisions.

1 **5.1.1 Geographic Information System Analysis**
2

3 A geographic information system (GIS) was used to organize the environmental data and
4 identify and quantify the resources potentially affected under each alternative. The following
5 source documents were used to obtain this data.
6

- 7 • Draft *Hanford Site Biological Resources Management Plan* (BRMaP) (DOE-RL
8 1996c) for biological elements including salmonid spawning areas; hawk and eagle
9 nesting, perching, and roosting sites; floodplains; wetlands; and plant communities of
10 concern (BRMaP Levels I, II, III, and IV)
11
- 12 • Waste Information Data System (WIDS)
13
- 14 • Hanford Geographic Information System (HGIS)
15
- 16 • Draft *Hanford Cultural Resources Management Plan* (CRMP) (DOE RL 1999) for
17 cultural resources, including pre-contact and post-contact sites
18
- 19 • *Site Evaluation Report for Candidate Basalt Quarry Sites* (BHI 1995c) for geologic
20 resources (analysis of basalt outcrops only)
21
- 22 • *Hanford Site Groundwater Monitoring for Fiscal Year 1997* (PNNL 1997b)
23
- 24 • *Hanford Site Development Plan* (DOE-RL 1994a) and other area development plans
25 (DOE-RL 1990a, and DOE-RL 1991a) for Site infrastructure, including buildings,
26 roads, and utilities
27
- 28 • *Hanford Site Environmental Report* (PNNL 1997a).
29

30 The GIS system includes spatial data on the distribution of resources, habitats, and
31 infrastructure and allows these elements to be mapped and quantified. The GIS system was
32 also used to quantify the land areas under each land-use designation for each alternative. The
33 land areas, in hectares, acres, square miles, and percent of total acreage, are presented in
34 Table 3-3. By combining the data sets for the resource elements listed above and the land
35 areas for each land-use designation, the amount of each resource element that could potentially
36 be affected under a given land-use designation was quantified. The GIS data tabulated for
37 BRMaP Levels II, III, and IV resources are further discussed in Section 5.2.3.
38

39 The GIS analysis has limitations for determining the impacts to a resource from future
40 land uses. For example, although approximately 16,833 hectares (ha) (41,595 acres [ac]) of
41 BRMaP Level III habitat fall under the Conservation (Mining) land-use designation under the
42 Preferred Alternative, it cannot be assumed that all of this habitat would be impacted by mining.
43 Future mining operations under this alternative could impact BRMaP Level III habitat, but the
44 size of the impact area cannot be quantified at this time. What can be determined at this time is
45 (1) those areas designated for Preservation would not be disturbed by mining in the future, and
46 (2) the mineral resources that are there are committed for Preservation.
47

48 **5.1.2 Identification of Key Resources, Unique Features, and Species**
49 **and Habitats of Concern**
50

51 The analysis of the alternatives was focused on resource elements that were identified as
52 important to DOE, the cooperating agencies, affected Tribal governments, and members of the
53 public. These elements were identified through public scoping, comments on the August 1996
54 *Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use*
55 *Plan* (HRA-EIS) (DOE 1996), and discussions with representatives of cooperating agencies and

1 American Indian Tribes. Generally, the resource elements can be categorized as follows:
2

- 3 • **Key resources**, including surface water (e.g., the Columbia River), groundwater,
4 economically viable geologic resources, and industrial infrastructure
5
- 6 • **Unique features**, including the White Bluffs, basalt outcrops, active and stabilized
7 sand dunes and bermounds and ripple marks created by the cataclysmic
8 Pleistocene Missoula Floods, viewing locations, viewsheds, archaeological and
9 historic sites, and areas of cultural and religious importance to American Indian
10 Tribes
11
- 12 • **Species and habitats of concern**, including plant communities of concern, wildlife
13 and wildlife habitat, aquatic species and habitat, wetlands, and biodiversity.
14

15 Plant communities of concern were identified using the classifications from BRMaP.
16 These classifications associate different management actions (i.e., monitoring, impact
17 assessment, mitigation, and preservation) with particular sets of biological resources. The
18 BRMaP classifies Hanford Site biological resources into four levels of management concern
19 (Figure 4-27), which can be summarized as follows:
20

- 21 • **Level I** biological resources are resources that require some level of status
22 monitoring because of the recreational, commercial, or ecological role or previous
23 protection status of the resources. Level I includes Washington State "Monitor 3"
24 species (DOE-RL 1996c).
25
- 26 • **Level II** biological resources require consideration of potential adverse impacts from
27 planned or unplanned Hanford Site actions for compliance with procedural and
28 substantive laws such as NEPA, CERCLA, and the *Migratory Bird Treaty Act of 1918*.
29 Mitigation of potential impacts by avoidance and/or minimization is appropriate for this
30 level; however, additional mitigation actions are not required. Level II resources
31 include Washington State Monitor 1 and 2 species and early successional habitats.
32
- 33 • **Level III** biological resources require mitigation because the resource is listed by the
34 State of Washington; is a candidate for Federal or state listing; is a plant, fish, or
35 wildlife species with unique or significant value; has a special administrative
36 designation (e.g., the Fitzner/Eberhardt Arid Lands Ecology Reserve [ALE Reserve]);
37 or is environmentally sensitive. When avoidance and minimization are not possible,
38 or application of these measures still results in adverse residual impacts above a
39 specified threshold value, mitigation by rectification and/or compensation is required.
40 Maintenance of Level III resource values may prevent more restrictive and costly
41 management prescriptions in the future. Level III resources include Washington
42 State candidate and sensitive species, threatened and endangered species, Federal
43 candidate species, wetlands and deep-water habitats, and late-successional habitats.
44
- 45 • **Level IV** biological resources justify preservation as the primary management option
46 because these resources are federally protected or have regional and national
47 significance. The plant communities and habitats that are defined as belonging to
48 this level are of such high quality and/or rarity that damages to these resources
49 cannot be mitigated except through compensatory mitigation by acquiring and
50 protecting in-kind resources. The legally protected species that are included in
51 Level IV cannot be impacted without the concurrence of the U.S. Fish and Wildlife
52 Service (USFWS) or the National Marine Fisheries Service so these types of impacts
53 do not jeopardize the continued existence of the species. Level IV resources include
54 Federal threatened and endangered species and those species proposed for listing,

1 rare habitats such as the White Bluffs, active and stabilized sand dunes, and basalt
2 outcrops.

3
4 The analysis of impacts to biological resources included an evaluation of effects on
5 BRMaP Levels II, III, and IV plant communities.

6 7 **5.1.3 Description of Impacting Activities**

8
9 The nine land-use designations used to develop the alternatives discussed in Chapter 3
10 are each unique in defining allowable future uses. However, impacts to resources would be
11 similar for several land-use designations. For example, the Industrial, Industrial-Exclusive,
12 Research and Development, and High-Intensity Recreation land-use designations would each
13 involve siting and construction of facilities with surface disturbance, increased traffic, and other
14 similar impacts. Therefore, to simplify the analysis, the possible impacts under the nine land-use
15 designations were organized into five impacting activities, defined as follows:

- 16
17 • **Mining**, including removal of vegetation, surface and subsurface disturbance,
18 changes in groundwater hydrology, and increased dust and noise generation under
19 the Conservation (Mining) and Conservation (Mining and Grazing) land-use
20 designations
- 21
22 • **Livestock grazing**, including changes to vegetation cover and plant species
23 composition under the Conservation (Mining and Grazing) land-use designation
- 24
25 • **Cultivated agriculture**, including removal of vegetation, surface disturbance (e.g.,
26 soil tillage), use of agricultural chemicals, increased water usage, changes to
27 groundwater hydrology, and increased dust and noise generation under the
28 Agriculture land-use designation
- 29
30 • **Development**, including removal of vegetation, surface disturbance, construction and
31 operation of facilities, increased traffic, increased dust and noise generation,
32 increased water usage, and changes in groundwater hydrology under the Industrial,
33 Industrial-Exclusive, Research and Development, and High-Intensity Recreation land-
34 use designations
- 35
36 • **Recreation**, including increased traffic and increased fishing, hunting, boating,
37 bicycling, hiking, and picnicking, under the Low-Intensity Recreation, Conservation
38 (Mining and Grazing), Conservation (Mining), and Preservation land-use
39 designations.

40
41 These five impacting activities were used in the analysis to identify and describe, in
42 general terms, the potential impacts to resource elements under each land-use designation.

43 44 **5.1.4 Consideration of the Comprehensive Land-Use Plan Policies** 45 **and Implementing Procedures**

46
47 With the exception of the No-Action Alternative, impacts to resources from the activities
48 described above likely would be mitigated through the application of the CLUP policies and
49 implementing procedures described in Chapter 6. For example, a Use Request involving a
50 proposed sand and gravel quarry in an area designated for Conservation (Mining) would be
51 subject to review as described in Section 6.4. After completing the review, DOE may deny the
52 request or issue a conditional use permit with project modifications to avoid protected resources
53 or to mitigate damages to those resources. For the purpose of this analysis, the impacts of the
54 alternatives are compared without consideration of the possible mitigating effects of the CLUP
55 policies and implementing procedures discussed in Chapter 6. This approach allows for clearer

1 comparisons of the potential impacts from each alternative and does not take credit for policies
2 and implementing procedures that are actually part of the alternatives (except the No-Action
3 Alternative) and not fully developed or in place. The CLUP policies and implementing
4 procedures are discussed along with other possible mitigation measures under each resource
5 section.

7 **5.1.5 Identification of Impacted Resources**

8
9 The potential environmental impacts of proposed land-use designations under each
10 alternative were evaluated by comparing the locations of impacting activities under each
11 alternative to the locations of key resources, unique features, and species and habitats of
12 concern on the Hanford Site. This enabled the generation of tables showing which resource
13 elements would be affected by impacting activities under each alternative. Tables found in
14 Section 5.2 provide an overview of the potential environmental consequences of each alternative
15 and allow for simple comparisons of the alternatives. The identification of the affected resource
16 elements provides a focus for the discussion of impacts under each alternative.

18 **5.1.6 Methods and Assumptions for Estimating Socioeconomic Impacts**

19
20 The possible socioeconomic impacts of each alternative were analyzed by focusing on
21 the possible opportunities for economic development posed by each alternative. This approach
22 provides for meaningful comparison of the alternatives without attempting to predict specific
23 impacts, such as changes in demand for housing, schools, or other services. These types of
24 impacts are best assessed on a project-by-project basis, through the appropriate local planning
25 processes.

26
27 The study area for this analysis was limited to Benton, Franklin, and Grant counties,
28 including the cities of Kennewick, Pasco, Richland (the Tri-Cities), and West Richland which are
29 most likely to be affected by land-use changes. The assumptions used for and the general
30 socioeconomic effects of each land-use designation are discussed below.

31
32 **5.1.6.1 Industrial.** The potential socioeconomic impacts of the Industrial land-use designation
33 were evaluated by comparing the amount of land available for industrial use under each
34 alternative to the estimated land needs for future industrial development. The land needs for
35 future private industrial development were estimated by the Benton County Planning Department
36 by correlating industrial land needs with projected population growth (BCPD 1997). For the
37 purpose of this analysis, it was assumed that future industrial land needs would be met using
38 lands on the Hanford Site and not other lands in the study area that are currently zoned for
39 industrial use.

40
41 Assumptions are that annual population growth in the study area would continue at a rate
42 of 2 percent during the 50-year planning period. This growth rate was extrapolated from the
43 Washington State Office of Financial Management "medium series" population projections for
44 Benton County for the period between the years 2010 and 2020. This growth rate corresponds
45 to a population increase of approximately 193,000 for Richland, West Richland, Kennewick, and
46 Pasco. Using a factor of 6 ha (15 ac) per 1,000 population, the Benton County Planning
47 Department estimated that approximately 1,200 ha (3,000 ac) would be needed for industrial
48 development to support the population growth. This estimate was increased to 1,620 ha
49 (4,050 ac) to account for interior roads, railroads, and utility corridors needed to support the
50 industries. The amount of land designated for industrial use under each alternative was
51 compared to the estimated need for 1,620 ha (4,050 ac).

52
53 The amount of land under the Industrial land-use designation for each alternative was
54 correlated with potential employment levels using data on Tri-Cities industrial development
55 compiled by the Benton County Planning Department. Possible levels of employment,

1 expressed as ranges, were determined for each alternative using data on the percentage of
2 lands under industrial zoning designations that are currently developed, and scaling factors
3 similar to those described in Section 5.1.5.4 for the Research and Development land-use
4 designation. The ranges of predicted employment levels used were less than 100 employees,
5 100 to 1,000 employees, and over 1,000 employees.
6

7 Because DOE has a continuing mission at the Hanford Site and because Site lands are
8 under Federal ownership, the potential for future federally sponsored industrial projects also
9 must be considered. These projects may include DOE activities for current or future missions,
10 DOE-sponsored privatization efforts, interagency training facilities such as the Hazardous
11 Materials Management and Emergency Response Facility (HAMMER) Training and Education
12 Center, or projects sponsored by other agencies. Because the land needs for future Federal
13 projects are not currently known, the alternatives cannot be evaluated to determine whether they
14 would meet these needs. Therefore, the alternatives are evaluated and compared based on the
15 amount of land available to support DOE's mission or for other federally sponsored industrial
16 development, over and above the estimated need projected by the Benton County Planning
17 Department for private industrial development.
18

19 **5.1.6.2 Industrial-Exclusive.** The Industrial-Exclusive land-use designation applies to the
20 Central Plateau, where DOE would continue waste management activities. Although all the
21 alternatives being considered would accommodate current waste management activities, the
22 alternatives differ in the amount of acreage available for future waste management activities.
23 The extent to which these differences would affect future development and the resulting
24 economic impacts are discussed.
25

26 **5.1.6.3 Agricultural.** The impacts of the Agricultural land-use designation were evaluated
27 based on the increase in land available for agriculture use, as a percentage of total agricultural
28 land in Benton, Franklin, and Grant counties. The increase in land available was correlated to
29 increased sales of agricultural products. These correlations were made using data from the
30 Census of Agriculture (USDA-NASS 1992), and the Benton County Agricultural Extension Office
31 (Watson et al. 1991), and did not consider impacts on prices due to scales of economy or
32 market share.
33

34 Although it is impossible to predict any commodity market over the next 50 years, the
35 markets for apples, potatoes, and wheat are currently soft. For example, an estimated
36 105 million 42-pound boxes of apples were picked in 1998, whereas in an average year, such as
37 1997, about 78 million boxes were picked. Currently there is a market for only 80 to 90 million
38 boxes, and Washington apple growers are faced with the option of leaving apples unpicked,
39 reducing orchards, or paying for increased marketing in an attempt to gain market share (TCH
40 1998a) (see Table 3-2).
41

42 Three scenarios for agricultural development on the Wahluke Slope were identified, as
43 follows:
44

- 45 • **Scenario 1** -- All lands under the Agricultural land-use designation, except those
46 lands in the Bureau of Reclamation's (BoR's) Red Zone, would be used to produce a
47 mix of crops similar to those currently produced in the three-county study area, and
48 lands in the Red Zone would be used for grazing.
- 49 • **Scenario 2** -- All lands under the Agricultural land-use designation, including those
50 lands in the Red Zone, would be used to produce a mix of crops similar to those
51 currently produced in the three-county study area.
- 52 • **Scenario 3** -- All lands under the Agricultural land-use designation, except those
53 lands in the Red Zone, would be used to produce specialty crops such as irrigated
54
55

1 vegetables and irrigated fruit orchards, and lands in the Red Zone would be used for
2 grazing.
3

4 **5.1.6.4 Research and Development.** The Research and Development land-use designation
5 involves the siting of large-scale facilities in clusters or campus-like developments. Other
6 research and development (R&D) facilities are similar to industrial development, such as the
7 facilities located in the 300 Area. These types of R&D facilities are compatible with industrial
8 land uses and are addressed in the Industrial land-use designation; however, in some cases,
9 R&D facilities may require large safety zones or may require separation from other facilities to
10 minimize noise, dust, or vibrational impacts. For these reasons, development on lands under the
11 Research and Development land-use designation is assumed to occur at a lower density than for
12 the Industrial land-use designation. Because R&D facilities often require large capital
13 investments and provide relatively high salaries compared to other industries, the economic
14 impacts could be significant.
15

16 The Research and Development land-use designation was evaluated by estimating
17 potential employment levels that could be supported by the research and development land base
18 under each alternative. This method, which was developed by the Benton County Planning
19 Department, involved correlating acreage available for research and development uses with
20 employment levels using data from existing research and development projects associated with
21 the Hanford Site. These data include total acreage for each project, total square footage of
22 facilities, and total number of employees (Table 5-1). The average square footage per
23 employee and the average facility area-to-land area ratio shown in Table 5-1 were used to
24 estimate employment levels that would be associated with the research and development land
25 base under each alternative. Because of the uncertainties associated with predicting levels of
26 future use and the wide ranges represented by the data shown in Table 5-1, predicted
27 employment levels for Research and Development were represented as ranges, rather than as
28 point estimates. The predicted employment levels under each alternative were predicted to fall
29 within one of three ranges: up to 100 research and development employees, 100 to 300
30 research and development employees, and over 300 research and development employees.
31

32 **5.1.6.5 High-Intensity Recreation.** High-Intensity Recreation allows infrastructure
33 development such as potable water systems, septic systems, irrigation systems, paved parking
34 lots, and buildings to support the intended recreational or other seasonal activities. For the
35 purposes of impact analysis, the Benton County Planning Department High-Intensity Recreation
36 assumptions include establishment of the B Reactor Museum, a 27-hole golf course, and a
37 destination resort with a 350-room hotel and conference center and a recreational vehicle/trailer
38 park at Vernita Terrace, which is located near Vernita Bridge (BCPD 1997). The economic
39 impacts of intensive recreational use were estimated using available data for recreational visitor
40 days at Vernita Bridge, regional averages of recreational expenditures per visitor day, and data
41 from golf courses in the study area. These data and their sources are presented in Table 5-2.
42

43 In other alternatives, the High-Intensity Recreation land-use designation may also include
44 developed Tribal fishing sites. In the *Columbia River Treaty Access Fishing Sites Final Phase*
45 *Two Evaluation Report and Finding of No Significant Impact/Environmental Assessment*
46 (USACE 1995), in-lieu fishing sites (i.e., in-lieu fishing sites are provided by the Federal
47 government to affected treaty Tribes "in-lieu" of their traditional sites that were covered by the
48 Federal dam reservoirs) ranged from 21.6 ha to 0.36 ha (53.4 ac to 0.9 ac) and included paved
49 or gravel parking lots, boat ramps, restrooms, drinking water, fish cleaning stations, net repair
50 areas and fish drying sheds, and storage sheds.

Table 5-1. Calculation of Ratios for Estimating Employment Under the Research and Development Land-Use Designation.

Facility	Facility Area m ² (ft ²)	No. of Employees	Facility Area per Employee m ² (ft ²)	Total Land Area ha (ac)	Facility Area to Land Area Ratio
Environmental Molecular Sciences Laboratory	17,995 (199,940)	230	78 (870)	8 (20)	1:4
Laser Interferometer Gravitational Wave Observatory	561,519 (6,239,099)	20	28,076 (311,955)	594 (1,486)	1:10
Waste Sampling and Characterization Facility	1,293 (14,375)	65	20 (221)	0.4 (1)	1:3
Fast Flux Test Facility	101,025 (1,122,500)	700	144 (1,604)	3,164 (7,909)	1:307
Superconducting Magnetic Energy Storage Facility ^a	19,602 (217,800)	30	653 (7,260)	19 (207)	1:41
Average			5,794 (64,382)		1:73

^a The Superconducting Magnetic Energy Storage Facility - Engineering Test Model is no longer being proposed for siting at the Hanford Site.

Table 5-2. Data Used to Estimate Recreational Impacts.

Data Category	Datum	Source
<i>Recreational Use on the Columbia River and Wahluke Slope</i>		
Total, Hanford Reach	50,000 visits per year	NPS 1994
Sport fishing	30,800 visits per year	
Other day use	19,200 visits per year	
Persons per vehicle	2.3	
<i>Recreational User Expenditures (per person)</i>		
Sport fishing	\$39.06 per day	DOE et al. 1994
Overnight (used for RV park guests)	\$35.38 per day	
Day use	\$10.19 per day	
<i>Golf Courses</i>		
Number of golfers	150 per day	Phone survey of Tri-Cities golf courses, May 1997
Season	365 days/yr	
Expenditures per golfer	\$25/day	

5.1.6.6 Low-Intensity Recreation. The Low-Intensity Recreation land-use designation would increase opportunities for recreational activities in the study area. The socioeconomic impacts of this land-use designation were evaluated using the data for sport fishing and day-use activities provided in Table 5-2. Low-Intensity Recreation allows little to no infrastructure development to support the intended recreational activities.

1 **5.1.6.7 Conservation (Mining and Grazing) and Conservation (Mining).** Although the two
2 Conservation land-use designations are focused on habitat and resource conservation, limited
3 mining and commercial grazing, if permitted by DOE, would be allowed. The economic impact
4 of commercial grazing was evaluated by correlating the increased land available to the increase
5 in the number of cattle that could be supported over the current baseline. Conversion factors of
6 0.17 animal-unit-months (AUMs) per hectare (0.067 AUM/acre) and \$12/AUM (1998 dollars)
7 were used to estimate the economic impacts of grazing.
8

9 The economic effects of limited mining under the two Conservation land-use
10 designations were not quantitatively evaluated because of the speculative nature of developing
11 mineral and natural gas deposits and the lack of data on mining in the study area. The amount
12 and location of lands designated for Conservation uses under each alternative could indirectly
13 affect remediation costs by affecting the costs of obtaining geologic materials for constructing
14 barriers over waste sites. These cost impacts are discussed for each alternative.
15

16 **5.1.6.8 Preservation.** The Preservation land-use designation is reasoned to have little direct
17 impact, although indirect impacts may include improvements in the quality of life, new
18 educational and research opportunities, and benefits associated with ecotourism.
19

20 **5.1.7 Methodology for Evaluating Environmental Justice Impacts**

21
22 Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority*
23 *Populations and Low-Income Populations* (59 FR 7629), directs Federal agencies to consider
24 environmental justice during the NEPA process, and to incorporate environmental justice as part
25 of the agency mission. Federal agencies are specifically directed to identify and address
26 disproportionately high and adverse human health or environmental effects of programs,
27 policies, and activities on minority and low-income populations to the greatest extent practicable
28 and permitted by law.
29

30 **5.1.7.1 Definitions.** The following definitions were used to identify potential environmental
31 justice impacts.
32

- 33 • **Census block group:** An area defined for the purpose of monitoring census data
34 that generally consists of between 250 and 550 housing units.
35
- 36 • **Minority population:** A group of people and/or communities experiencing common
37 conditions of exposure or impact that consists of persons classified by the
38 U.S. Bureau of the Census as Negro/Black/African American, Hispanic, Asian and
39 Pacific Islander, American Indian, Eskimo, Aleut, and other non-White persons,
40 based on self-classification by the people according to the race with which they most
41 closely identify. For purposes of analysis, minority populations are defined as those
42 census tracts within the zone of impact where the percent minority population
43 exceeds the percentage minority population within the entire zone of impact. Census
44 tracts where the percent minority population exceeds 50 percent also are considered
45 minority populations. In the case of migrant or dispersed populations, a minority
46 population consists of a group that is greater than 50 percent minority.
47
- 48 • **Low-income community:** An area where the median household income is at least
49 80 percent or more below the median household income for the metropolitan
50 statistical area (urban) or county (rural). The 80 percent threshold was used based
51 on definitions used by the U.S. Department of Housing and Urban Development.
52
- 53 • **Population base:** Census tracts were included in the analysis if 50 percent of the
54 geographic area of the tract fell within the 80-kilometer (km) (50-mile [mi]) radius of
55 the Hanford Site.

- **Disproportionately high and adverse human health effects:** Adverse health effects are measured in risks and rates that could result in latent cancer fatalities, as well as other fatal or nonfatal impacts to human health. Disproportionately high and adverse human health effects occur when the risk or rate for a minority population or low-income population from exposure to an environmental hazard significantly exceeds the risk or rate to the general population and, where available, to other appropriate comparison groups.
- **Disproportionately high and adverse environmental impacts:** An adverse environmental impact is an environmental impact determined to be unacceptable or above generally accepted norms. A disproportionately high impact refers to an impact (or risk of an impact) in a low-income or minority community that significantly exceeds the impact on the larger community.

5.1.7.2 Demographic Data. Demographic information obtained from the U.S. Bureau of Census was used to identify minority populations and low-income communities within an 80-km (50-mi) radius surrounding the 200 East Area on the Hanford Site at the census block group level (Neitzel et al. 1997). For the evaluation of environmental justice impacts, the area defined by this 80-km (50-mi) radius was considered the zone of potential impact.

Characterization of minority and low-income populations residing within a geographical area is sensitive to the basic definitions and assumptions used to identify those populations. Federal guidance on environmental justice with regard to the definition of an area that has a minority or low-income population large enough to act as a test for a disproportionate impact has not been developed. Consequently, the number of individuals identified as minority and/or low-income individuals within the population around a particular site may vary from analysis to analysis. Several different approaches to identification of minority and low-income populations have been used in recent DOE environmental impact statements (EISs). The approach presented in this Final HCP EIS is consistent with the approach used in the *Hanford Site National Environmental Policy Act (NEPA) Characterization* (Neitzel et al. 1997). Other demographic studies may use different assumptions and, consequently, report a different total population, minority population, or low-income population, depending on the assumptions used to identify each population.

5.2 Resource Impacts

The CLUP would consist of three parts: land-use maps, policies, and implementing procedures. Because of the mitigating influences of the policies and implementing procedures presented in Chapters 3 and 6, relying solely on the land-use map designation to determine impacts would be misleading. While the policies and implementing procedures in Chapter 6 provide a certain level of flexibility in Site development (e.g., Special Use Permits and Plan Amendments), resources would be managed and protected through the application of the policies and implementing procedures ensuring that future development would be orderly and reflective of the policies and implementing procedures limitations.

5.2.1 Geologic Resources

The Hanford Site includes geologic resources that are unique or have economic value. The unique features include the White Bluffs and basalt outcrops with their talus slopes, such as Gable Mountain and Gable Butte; Missoula Floods features; and active and stabilized sand dunes, which have aesthetic, historic, and ecological value or are valuable for scientific study. Many of these features also have cultural resource value and are discussed in Section 5.2.4. Soils on the Hanford Site can also be considered to have ecological value. Key geologic

1 resources include soil, sand and gravel, pea gravel, basalt, and natural gas deposits, which are
2 needed to support remedial activities or have economic value for future development. Geologic
3 materials required to support remediation at the Hanford Site are discussed further in
4 Appendix D.
5

6 Impacts of the alternatives on unique geologic features on the Hanford Site are
7 described in the following sections and summarized in Table 5-3. Impacts of the alternatives on
8 the availability of key geologic resources are summarized in Table 5-4. The primary impacts to
9 unique geologic features would occur from mining under the Conservation land-use
10 designations. Development under the Industrial, Research and Development, and High-Intensity
11 Recreation land-use designations could also result in destruction of unique features. Grazing is
12 not anticipated to have impacts on these features, although overgrazing could result in increased
13 erosion of some features.
14

15 **5.2.1.1 No-Action Alternative.** Under the No-Action Alternative, unique geologic features
16 could be impacted by mining. Basalt outcrops could be developed as quarry sites for obtaining
17 geologic materials for remediation although the CRMP would require extensive consultation that
18 could result in stopping the proposed use. According to an engineering assessment (Appendix
19 D), Gable Mountain and Gable Butte represent the most economic and technically feasible
20 basalt sources available for remediation. In the absence of a land-use plan, features such as
21 active and stabilized sand dunes and Missoula Floods features could be impacted by
22 commercial sand and gravel operations. These features could also be impacted by industrial
23 development. Soils on the Hanford Site could be impacted by mining, grazing, and cultivated
24 agriculture, which would increase soil compaction and erosion. Industrial development in the
25 southeast portion of the Hanford Site would destroy dune stabilizing vegetation that could result
26 in activation of sand dunes.
27

28 The No-Action Alternative would permit the commercial development of geologic
29 resources on most of the Hanford Site, and would not restrict use of geologic resources needed
30 to support remediation activities. The current administrative designations for the Saddle
31 Mountain National Wildlife Refuge (NWR) and the Wahluke Slope do not preclude mining; in
32 fact, some mining is occurring on those lands. The administrative designation for the ALE
33 Reserve also would not preclude development of existing natural gas claims on the Reserve.
34

35 **5.2.1.2 Preferred Alternative.** Under the Preferred Alternative, unique geologic features,
36 including Gable Mountain and Gable Butte, the White Bluffs, and the active sand dunes would
37 be protected under the Preservation land-use designation. Missoula Floods features could be
38 impacted by sand and gravel operations. Mining could result in soil compaction and increased
39 erosion around quarry sites. Industrial development in the southeast portion of the Hanford Site
40 could destroy dune stabilizing vegetation that could result in activation of the sand dunes.
41

42 The Preferred Alternative would not exclude the commercial development of existing
43 natural gas claims on the ALE Reserve. However, the Preservation land-use designation for the
44 areas of the ALE Reserve surrounding those claims would preclude construction of an access
45 road to the claims, and could make future development costly.

Table 5-3. Potential Adverse Impacts of Land-Use Alternatives on Unique Geologic Features.

Alternative	Impacting Activity	Impacts to Unique Geologic Features (✓ = impact) ^a				
		Soils	Basalt Outcrops	White Bluffs	Missoula Floods Features	Sand Dunes
No-Action	Mining	✓	✓		✓	✓
	Livestock grazing	✓				✓
	Cultivated agriculture	✓		✓		
	Development				✓	✓
	Recreation					
Preferred Alternative	Mining	✓			✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development					✓
	Recreation					
Alternative One	Mining	✓				✓
	Livestock grazing					
	Cultivated agriculture					
	Development					✓
	Recreation					
Alternative Two	Mining					
	Livestock grazing					
	Cultivated agriculture					
	Development					
	Recreation					
Alternative Three	Mining	✓			✓	✓
	Livestock grazing	✓				
	Cultivated agriculture	✓		✓		
	Development				✓	✓
	Recreation					
Alternative Four	Mining	✓				✓
	Livestock grazing					
	Cultivated agriculture					
	Development					✓
	Recreation					

^a Checkmarks do not represent adverse impacts of comparable significance; refer to accompanying text for significance of impacts.

Table 5-4. Opportunities for Geologic Resource Development Under the Alternatives.

Alternative	Development of Geologic Resources Allowed (✓ = yes)				
	Soil	Basalt	Pea Gravel	Sand and Gravel	Natural Gas
No-Action	✓	✓	✓	✓	✓ ^a
Preferred Alternative	✓ ^b	✓ ^b	✓	✓ ^b	✓ ^a
Alternative One	✓ ^b	✓ ^b		✓ ^b	✓ ^a
Alternative Two					✓ ^a
Alternative Three	✓	✓	✓	✓	✓ ^a
Alternative Four	✓ ^b	✓ ^b		✓ ^b	✓ ^a

^a Development of existing natural gas claims held by the Big Bend Alberta Mining Company could not be precluded under any alternative.

^b Under this alternative, basalt, sand, and gravel resources could be quarried to support governmental purposes, and could not be commercially developed.

Although basalt quarrying would not be permitted at Gable Mountain or Gable Butte, other viable sources, such as the below-grade ALE Reserve quarry (located along State Highway 240), could be developed to provide geologic materials for remediation and construction supporting future DOE missions and other governmental purposes. However, development of these sources could result in higher remediation costs than quarries at Gable Mountain or Gable Butte (see Appendix D). Geologic resources on approximately 30 percent (44,183 ha [109,179 ac]) of Hanford lands would be available for commercial development under the Preferred Alternative; however, those geologic features that have unique characteristics could be excluded from development by the permitting process.

5.2.1.3 Alternative One. Under Alternative One, unique geologic features, including Gable Mountain and Gable Butte, the White Bluffs, Missoula Floods features, the active sand dunes and most of the stabilized sand dunes, would be protected under the Preservation land-use designation. Mining of geologic materials to support remediation could increase soil compaction and erosion around quarry sites.

Alternative One would allow mining in areas around the Laser Interferometer Gravitational-Wave Observatory (LIGO) and the Fast Flux Test Facility (FFTF), and in other scattered locations in the 100 and 600 Areas. Mining would be allowed in these areas to support Hanford Site remediation activities, future DOE missions, and other uses. As with the Preferred Alternative, Alternative One would allow commercial development of the existing natural gas claims on the ALE Reserve, but Alternative One would not allow any other commercial development of geologic resources.

5.2.1.4 Alternative Two. Under Alternative Two, unique geologic features (including Gable Mountain and Gable Butte, White Bluffs, Missoula Floods features, and active and stabilized sand dunes) would be protected under the Preservation land-use designation. This land-use designation would also minimize soil erosion by maintaining the existing vegetation cover.

As with the Preferred Alternative, Alternative Two would allow commercial development of the existing natural gas claims on the ALE Reserve. Alternative two would preclude the development of any other geologic resources on the Hanford Site. Geologic resources required to support remediation activities would have to be obtained from locations off the Hanford Site, which could increase remediation costs (see Appendix D).

1 **5.2.1.5 Alternative Three.** Under Alternative Three, unique geologic features could be
2 impacted by mining. Basalt outcrops, including Gable Mountain and Gable Butte, could be
3 developed as quarry sites for obtaining geologic materials for remediation, future DOE missions
4 and other uses. Missoula Floods features and active and stabilized sand dunes could be
5 impacted by sand and gravel quarrying. These features could also be impacted by industrial
6 development in the southern and eastern portions of the Hanford Site. Industrial development in
7 the southeast portion of the Hanford Site would destroy dune stabilizing vegetation and may
8 activate the sand dunes. Mining and grazing under Alternative Three could result in soil
9 compaction and increased soil erosion. Cultivated agriculture under Alternative Three would
10 increase soil erosion through removal of the existing vegetation cover and tillage. Soil
11 productivity could also decline with intensive cropping.
12

13 Alternative Three could result in increased landslide activity at White Bluffs by allowing
14 agricultural development on the Wahluke Slope. Previous studies (discussed in the Hanford
15 Reach EIS [NPS 1994]) suggest that irrigation of crops east of the White Bluffs has raised the
16 local water table, saturating the sedimentary materials in the bluffs and increasing the instability
17 of slopes along the Columbia River. Previous landslides at the White Bluffs have resulted in
18 increased sediment loading to the Columbia River. New development of irrigated agriculture on
19 the Wahluke Slope could contribute additional groundwater to the area, increasing slope
20 instability and the potential for additional landslides.
21

22 Alternative Three would allow basalt quarrying, mining of sand and gravel and pea gravel
23 resources, and development of natural gas deposits on the ALE Reserve. The Conservation
24 land-use designation on the ALE Reserve would not preclude construction of an access road to
25 existing natural gas claims. Under Alternative Three, geologic resources on approximately
26 53 percent (195,612 ha [483,368 ac]) of Hanford lands would be available for commercial
27 development; however, those geologic features that have unique characteristics could be
28 excluded from development by the permitting process.
29

30 **5.2.1.6 Alternative Four.** Under Alternative Four, unique geologic features (including basalt
31 outcrops, the White Bluffs, Missoula Floods features, and active and stabilized sand dunes)
32 would be protected under the Preservation land-use designation. This land-use designation
33 would also minimize soil erosion, although some soil compaction and increased soil erosion
34 could occur as a result of mining geological materials for remediation. Industrial development in
35 the southeast portion of the Hanford Site would destroy dune stabilizing vegetation that could
36 result in activation of sand dunes
37

38 As with the Preferred Alternative, Alternative Four would allow commercial development
39 of the existing natural gas claims on the ALE Reserve. Alternative Four would not allow any
40 other commercial development of geologic resources. Mining would be limited to basalt and
41 sand and gravel quarries developed to support remediation activities at the Hanford Site. These
42 quarries would be located in the south-central portion of the Site, in the areas designated as
43 Conservation (Mining). Basalt quarrying would not be permitted at Gable Mountain or Gable
44 Butte under this alternative, but the ALE Reserve quarry located along State Route 240 could be
45 developed to provide geologic materials for remediation.
46

47 **5.2.1.7 Mitigation Measures.** Future development of and access to Hanford Site geologic
48 resources would require review under the CLUP policies and implementing procedures
49 described in Chapter 6. These procedures, which would be implemented under any of the
50 alternatives being considered except the No-Action Alternative, would require avoidance or
51 minimization of the impacts of mining or quarrying. Proposed mining or quarrying activities
52 would be controlled through the issuance of special-use permits to be consistent with the CLUP

1 policies and implementing procedures requiring the protection of natural and cultural resources.
2 Other mitigation measures that could reduce impacts to unique geologic features include the
3 following:

- 4
- 5 • Researchers could be invited to make observations before and during excavation or
6 mining of unique features such as Missoula Floods features so the scientific value of
7 the features would not be lost.
- 8
- 9 • Efficient irrigation methods could be employed to minimize groundwater recharge in
10 the area of the White Bluffs.
- 11
- 12 • Rotational grazing methods could be employed to minimize soil erosion.
- 13
- 14 • Conservation tillage, fallowing, and other techniques could be used to reduce soil
15 erosion from croplands.
- 16
- 17 • Mining operations could be required to remove, stockpile, and replace topsoil.
- 18
- 19 • Soil stabilization techniques would be used around mining and development sites to
20 contain wind erosion.
- 21

22 **5.2.2 Water Resources**

23
24 Key water resources at the Hanford Site include surface water and groundwater. The
25 primary surface water feature is the Columbia River. Other surface water features include
26 springs and seeps. Groundwater is found throughout the subsurface of the Hanford Site at
27 depths ranging from approximately 250 meters (m) (820 feet [ft]) in the central portion of the Site
28 to approximately 15 m (50 ft) near the Columbia River.

29
30 Surface water resources could be impacted by future land uses in several ways. Water
31 quality could be degraded as a result of point source pollution from industrial waste water
32 discharges and non-point source pollution from runoff. Future industrial development and R&D
33 activities could increase waste water discharges to the Columbia River.

34
35 The Columbia River is classified as a "Class A" body of water by the State of
36 Washington, which requires that permitted discharges of waste water from point sources to the
37 river be as clean as, or cleaner, than the water in the river. Consequently, under normal
38 circumstances, industrial discharges to the river would be unlikely to impact water quality in the
39 river. Nevertheless, the potential for water quality impacts from new industrial activities must be
40 considered because of the potential for inadvertent releases and permit violations.
41 Contamination of groundwater from industrial development could also indirectly affect surface
42 water through groundwater discharges to the Columbia River. Industrial development could also
43 increase water withdrawals from the Columbia River.

44
45 Non-point source degradation of surface water could occur as a result of runoff of
46 agricultural chemicals from cultivated fields or a golf course. Surface water could also be
47 degraded through trampling of wetland vegetation by livestock congregating in the vicinity of the
48 water during dry periods. Loss of this vegetation could lead to increased siltation and water
49 quality degradation.

50
51 Impacts to groundwater could occur as a result of consumptive use or contamination.
52 Consumptive use could lead to draw down of aquifers and could change local groundwater flow
53 patterns. Groundwater flow could also be altered by infiltration of water used to irrigate crops
54 under the Agriculture land-use designation. Infiltration from irrigation could also mobilize
55 contaminants in the vadose zone and increase contamination of groundwater. Contamination

1 could occur as a result of infiltration of chemicals from spills. Groundwater contamination could
2 also occur as a result of infiltration of agricultural chemicals applied to crops, landscaped areas,
3 or golf courses.
4

5 Groundwater flow and contaminant transport models are used to simulate future
6 groundwater-flow conditions and predict the migration of contaminants through the groundwater
7 pathway. During the past several years, a Site-wide, three-dimensional, flow and transport
8 model has been under development by Pacific Northwest National Laboratory's (PNNL's)
9 Groundwater Monitoring Project.
10

11 Two-dimensional flow models have been used extensively at the Hanford Site. These
12 models were generally adequate for predicting aquifer head changes and directions of
13 groundwater flow prior to cessation of large wastewater-disposal operations because the
14 groundwater levels were somewhat stable across the Hanford Site. However, in the early
15 1990s, it was recognized that a three-dimensional model was needed for accurate calculation of
16 future aquifer head changes, directions of groundwater flow, mass transport, and predictions of
17 contaminant concentrations. The three-dimensional model was needed because there is
18 significant vertical heterogeneity in the unconfined aquifer, and the water table is dropping over
19 most of the Hanford Site in response to cessation of large wastewater discharges. The
20 unconfined aquifer system is composed of a series of conductive units that are separated from
21 each other in most places by extensive mud units with relatively low hydraulic conductivities.
22 Accounting for this vertical heterogeneity is particularly important as the water table drops,
23 because the water table is currently near the contact between the Hanford formation and the
24 underlying and much-less-conductive Ringold Formation over a large part of the Hanford Site.
25 Dewatering of the highly permeable Hanford formation sediments in some areas (PNL-10196)
26 may result in aquifer transmissivity changes. These changes would be an order of magnitude or
27 more that would not be properly accounted for by two-dimensional flow and transport models.
28

29 The Site-wide, three-dimensional model was used during fiscal year 1998 to support the
30 composite analysis for low-level waste disposal in the Hanford Site (PNNL-11800). The
31 composite analysis involved simulation of future transport of radioactive contaminants that are
32 expected to exist on the Hanford Site following site closure. Site closure was assumed to occur
33 in the year 2050, followed by a 1,000-year compliance period. Only sources within a designated
34 waste management area on the Central Plateau were considered because other potential
35 sources are assumed to be remediated before site closure to the level that they would not pose
36 a hazard. During the 1,000-year compliance period, potential exposure to radioactive
37 contaminants outside the waste management area must be within regulatory limits and
38 maintained "as low as reasonably achievable" (PNNL-11800). These future groundwater
39 conditions would be potential impacts common to all alternatives and are shown as Figures 5-1
40 through 5-9, which include the following:
41

- 42 • Figure 5-1 – Water Table Elevations Predicted for 2350 Compared to the Inferred
43 1944 Water Table
- 44
- 45 • Figure 5-2 – Predicted Tritium Plume from the 200 Areas for 2050
- 46
- 47 • Figure 5-3 – Predicted Iodine-129 Plume from the 200 Areas for 2049
- 48
- 49 • Figure 5-4 – Predicted Technetium-99 Plume from the 200 Areas for 2049
- 50
- 51 • Figure 5-5 – Predicted Uranium Plume from the 200 Areas for 2049
- 52
- 53 • Figure 5-6 – Predicted Strontium-90 Plume from the 200 Areas for 2049
- 54
- 55 • Figure 5-7 – Predicted Strontium-90 Plume from the 200 Areas for 2049

- Figure 5-8 -- Predicted Chlorine-36 Plume from the 200 Areas for 2049
- Figure 5-9 -- Predicted Selenium-79 Plume from the 200 Areas for 2049.

The potential for impacts to groundwater under each alternative is identified in Table 5-5, and the potential for impacts to surface water is identified in Table 5-6.

5.2.2.1 No-Action Alternative. Under the No-Action Alternative, mining operations could be undertaken within the All Other Areas geographic area and could occur in the vicinity of the Columbia River. Runoff from mining operations located close to the Columbia River could lead to water quality degradation because of erosion and release of silt to the river. Also, potential fuel or chemical spills on quarry sites could contaminate groundwater or surface water if the sites are located close to the Columbia River. Mining operations could also require water for material washing and dust control. Water use by mining operations would be minor compared to agricultural or industrial uses, and would be less likely to result in changes to groundwater hydrology. Quarry sites could collect surface water runoff, and provide a favorable infiltration surface thereby increasing recharge and mobilizing contaminants in the vadose zone below the quarry sites.

Grazing under the No-Action Alternative could occur in the vicinity of the Columbia River and could reduce riparian vegetation cover. Reduced cover could destabilize the river banks and increase sediment loading to the river. Grazing use under the No-Action Alternative would also require development of water sources. However, water consumption for grazing would be relatively small compared to other uses, such as agriculture or industrial development.

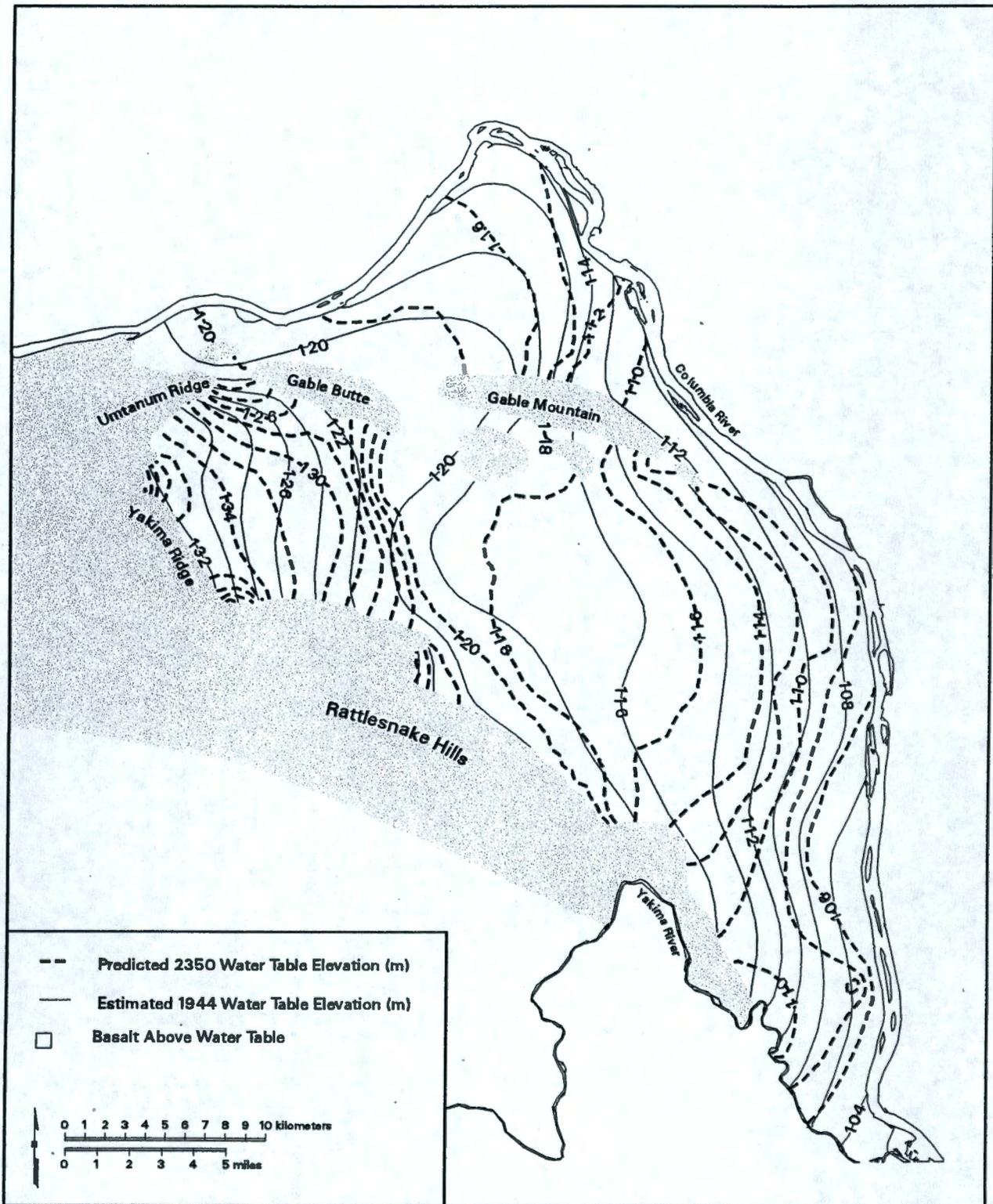
The No-Action Alternative could allow conversion of lands to cultivated agriculture in the All Other Areas geographic area. Agricultural development would most likely occur near the Columbia River, which would provide a clean source of irrigation water. Irrigation water could also be provided by groundwater wells, which would alter groundwater flow patterns through aquifer drawdown. Irrigation of crops could leach agricultural chemicals and residual Hanford Site contaminants from the vadose zone to the groundwater. Runoff from agricultural land could also degrade water quality in the Columbia River through release of agricultural chemicals and increased siltation.

The No-Action Alternative would allow industrial development throughout the All Other Areas geographic area. Future development would most likely occur in the South 600 Area because supporting infrastructure is available in this area. Water to support development could be obtained from on-site groundwater wells, as is the case in the 400 Area, provided by the City of Richland (as it is in the 300 Area), or withdrawn from the Columbia River. Consumptive use of groundwater to support development could lead to changes in groundwater flow patterns as a result of aquifer drawdown. Water quality degradation from new industrial point sources would be minimal because discharges (e.g., septic systems) to groundwater would require state or county permits, and because Federal permit discharges to the Columbia River must be as clean or cleaner than water in the river. However, water quality could be affected by accidental releases to the soil column or the Columbia River or Yakima River from industrial sites.

The No-Action Alternative would not increase recreational access to the Columbia River over existing conditions and, therefore, is unlikely to result in increased impacts to water quality from recreational activities.

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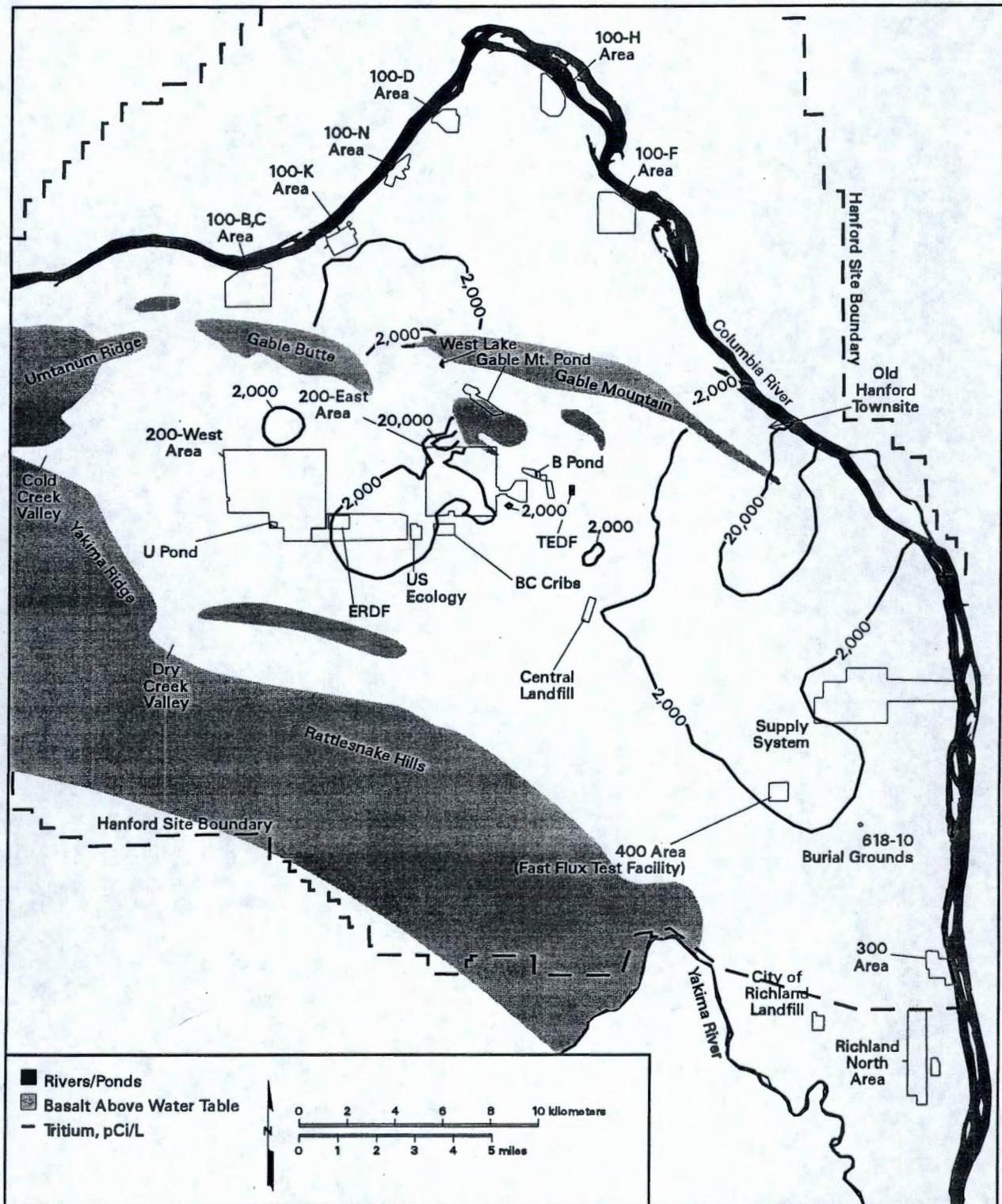
Figure 5-1. Water Table Elevations Predicted for 2350 Compared to the Inferred 1944 Water Table.



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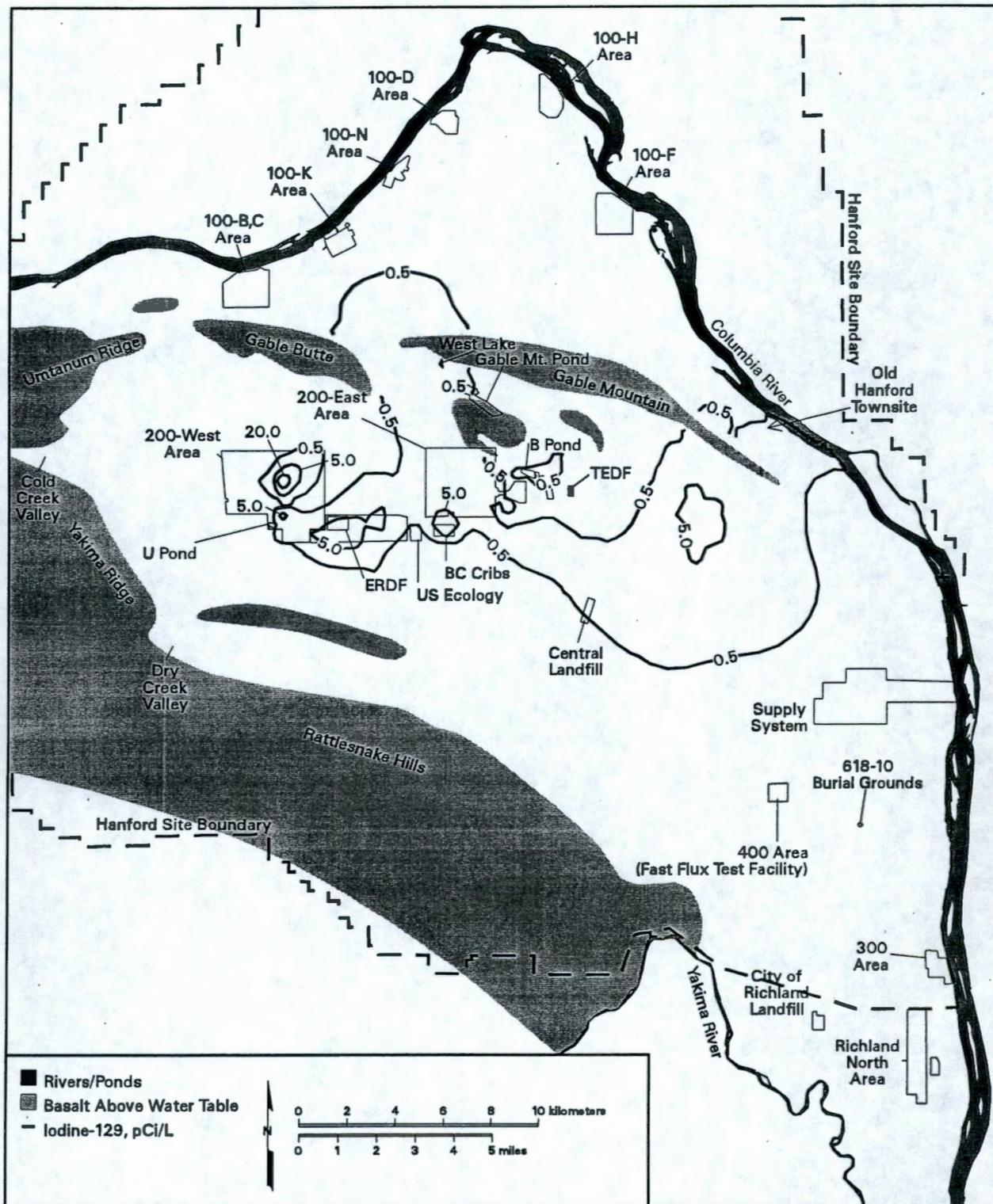
Figure 5-2. Predicted Tritium Plume from the 200 Areas for 2050.



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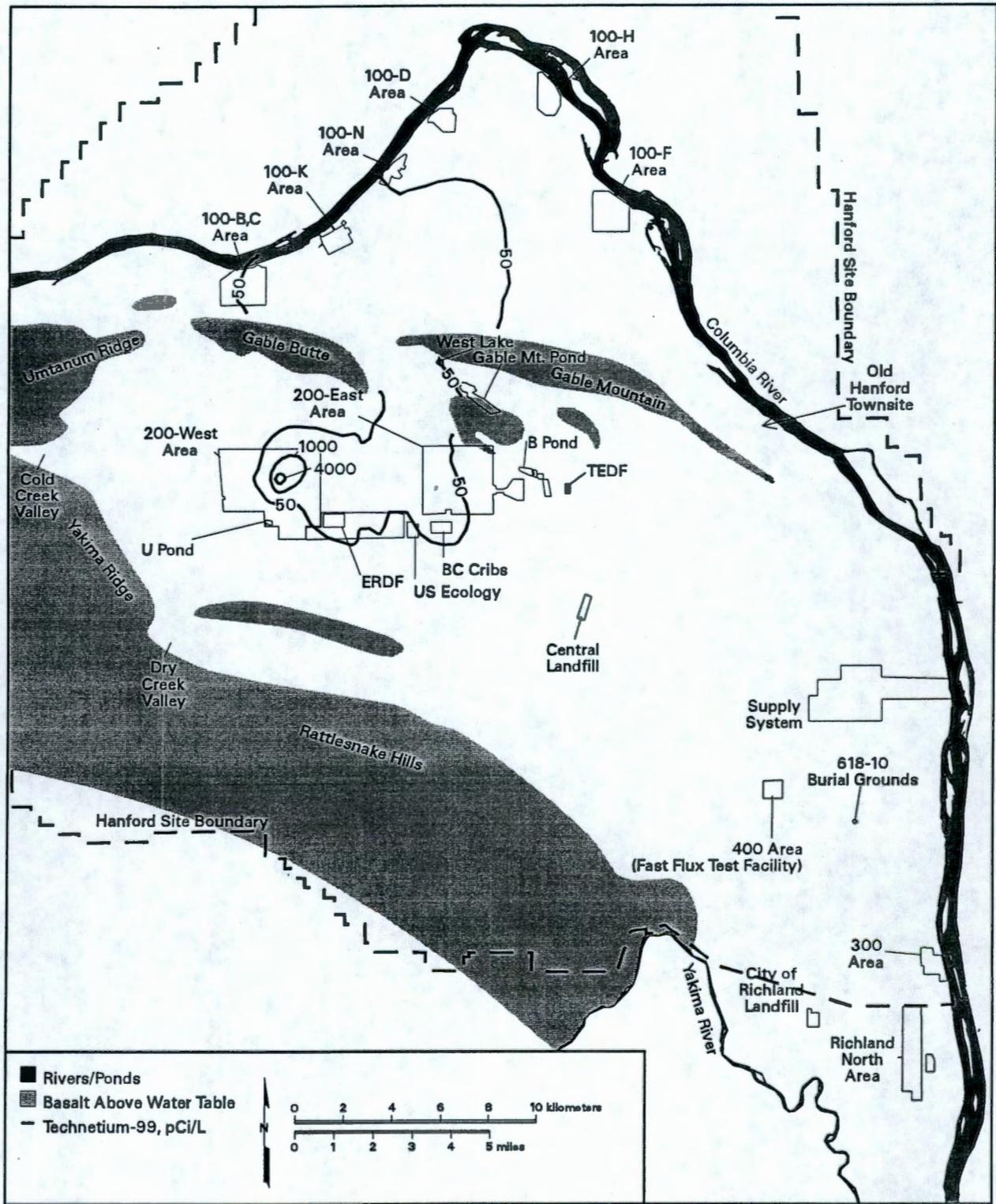
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Figure 5-3. Predicted Iodine-129 Plume from the 200 Areas for 2049.



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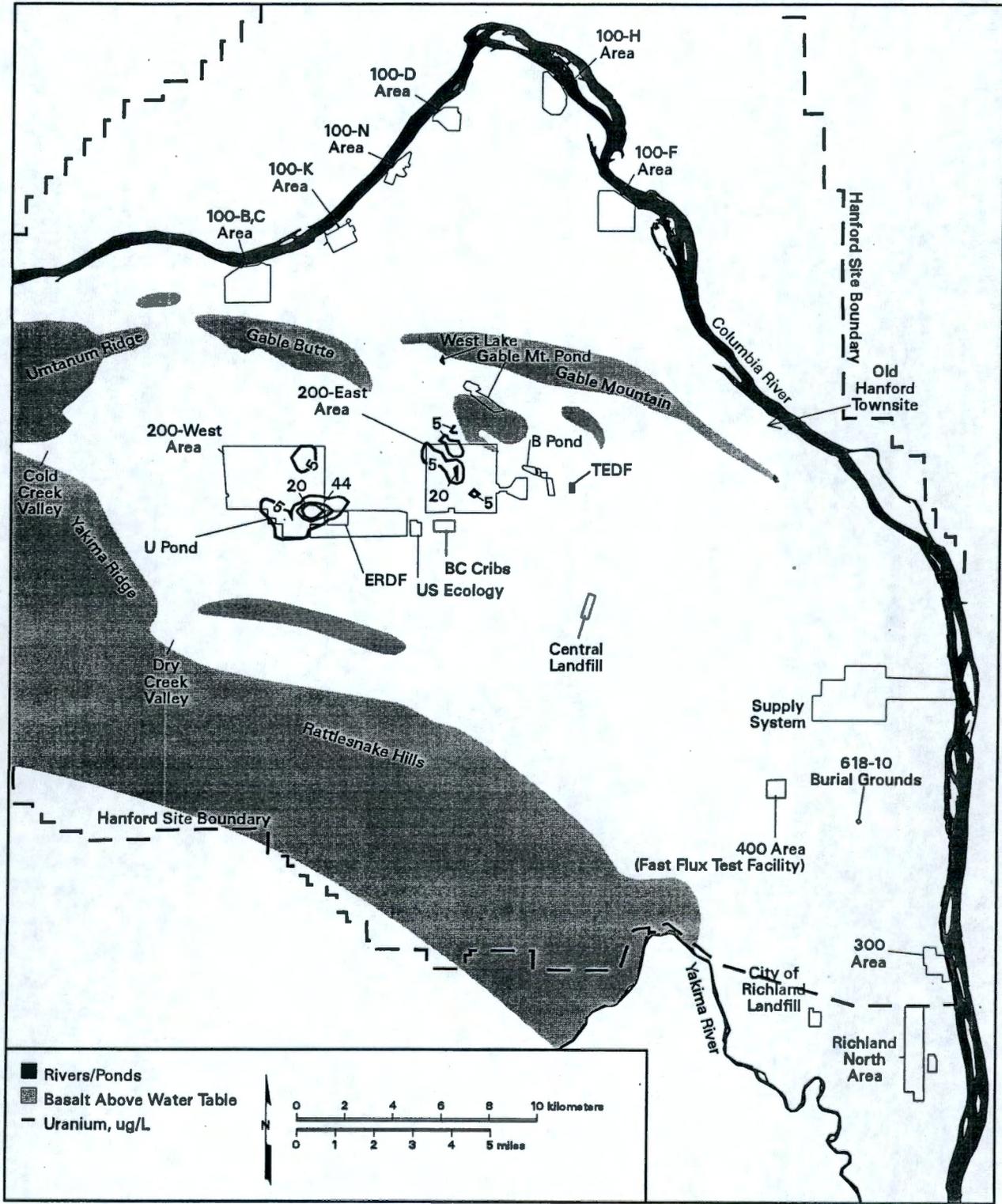
Figure 5-4. Predicted Technetium-99 Plume from the 200 Areas for 2049.



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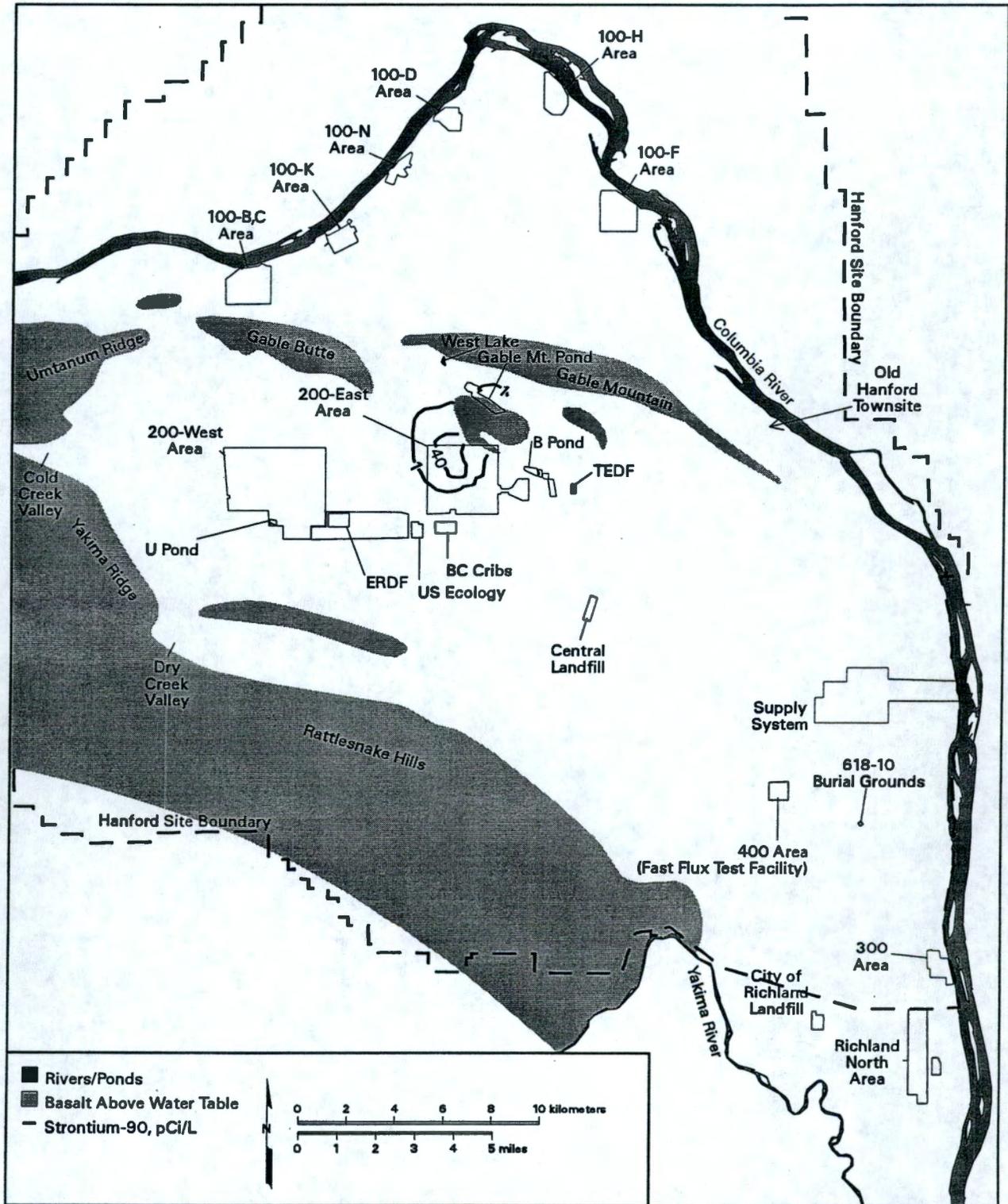
Figure 5-5. Predicted Uranium Plume from the 200 Areas for 2049.



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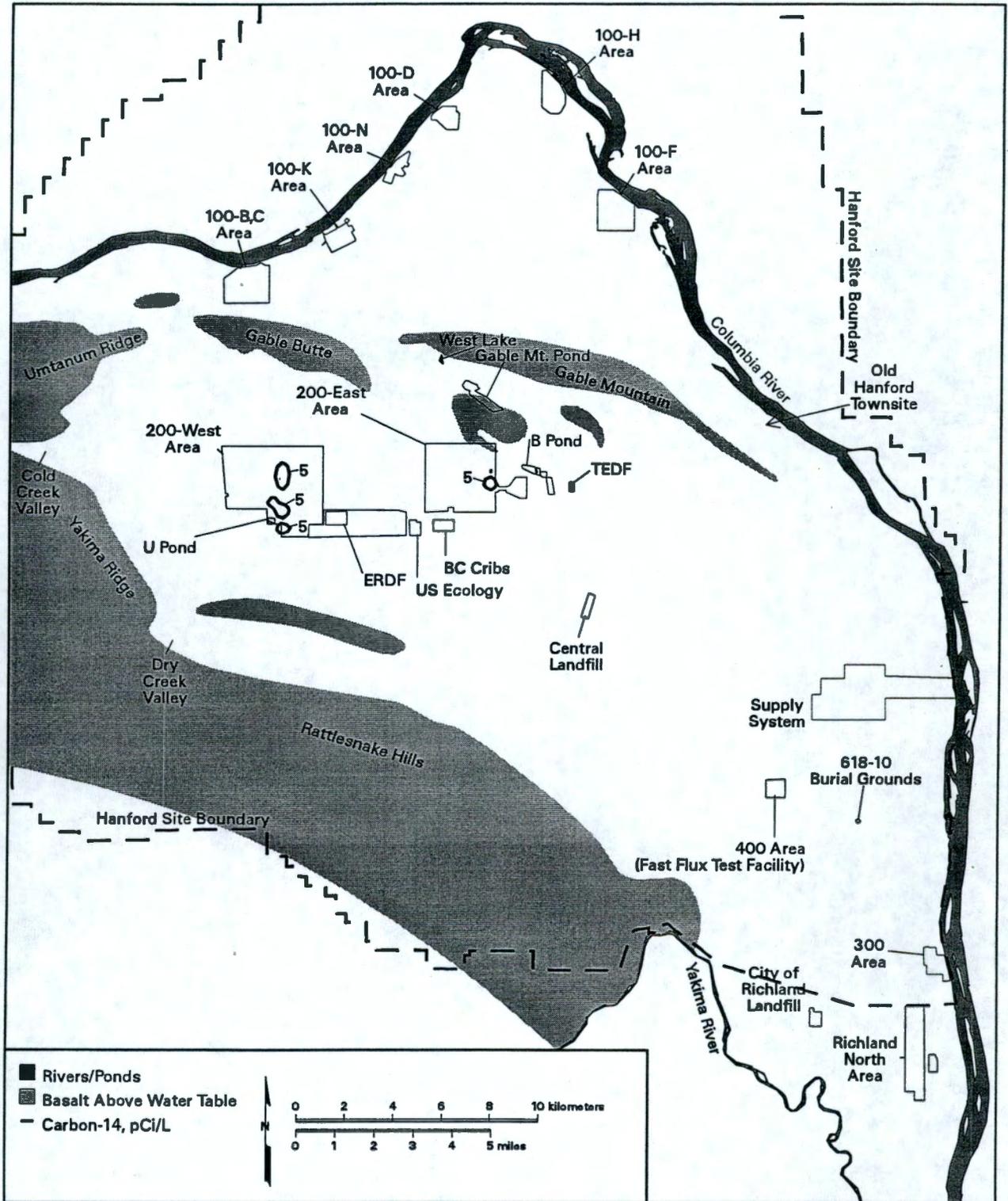
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Figure 5-6. Predicted Strontium-90 Plume from the 200 Areas for 2049.



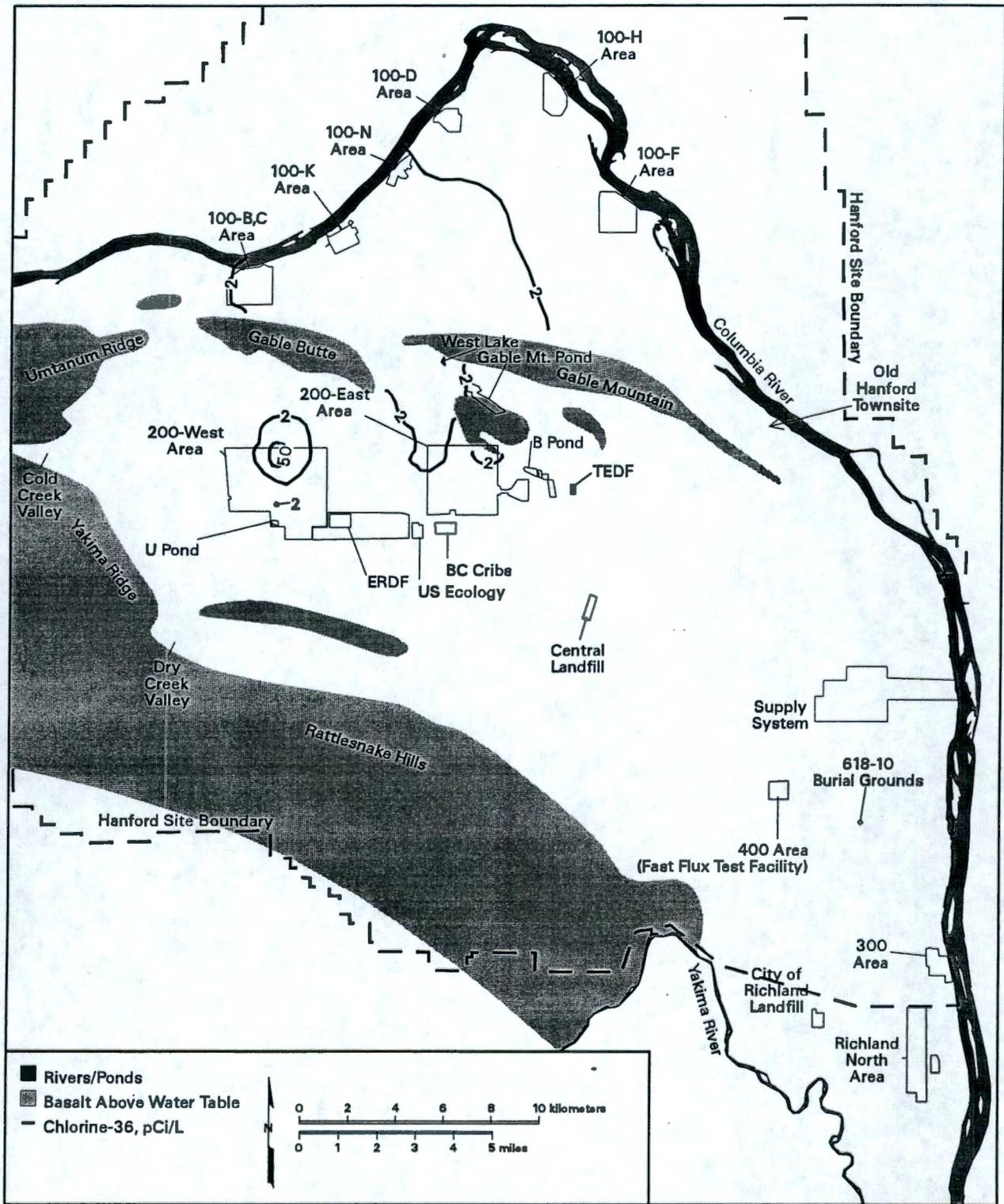
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Figure 5-7. Predicted Carbon-14 Plume from the 200 Areas for 2049.



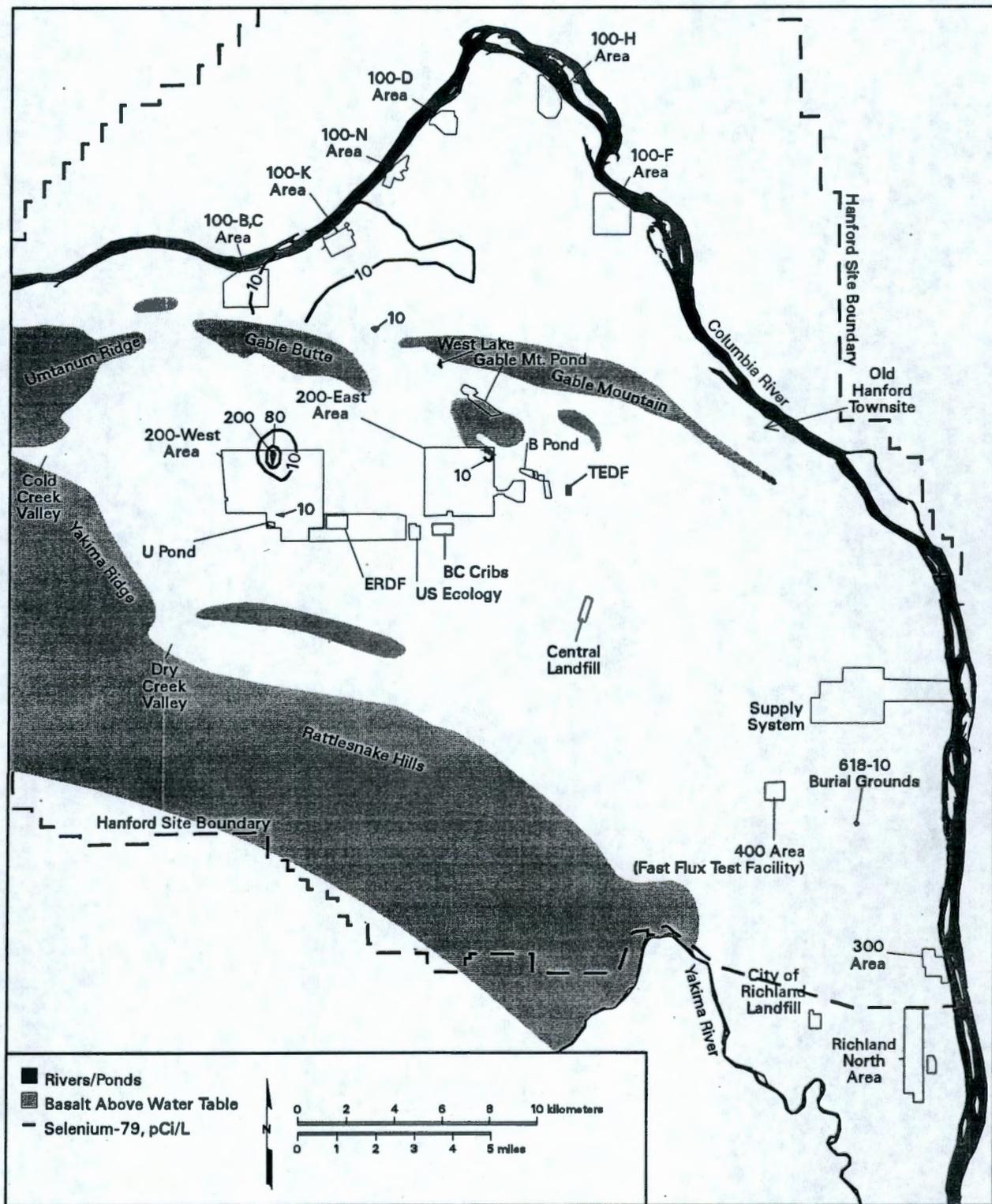
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Figure 5-8. Predicted Chlorine-36 Plume from the 200 Areas for 2049.



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Figure 5-9. Predicted Selenium-79 Plume from the 200 Areas for 2049.



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Table 5-5. Potential Impacts of Alternatives on the Vadose Zone and Groundwater.

Plan Map	Impacting Activity	Impacts to Vadose Zone and Groundwater (✓ = impact)*				
		Consumptive Use	Contamination (Spills)	Contamination (Agricultural Chemicals)	Mobilization of Contaminants	Changes to Hydrology
No-Action Alternative	Mining	✓	✓		✓	✓
	Livestock grazing					
	Cultivated agriculture	✓	✓	✓	✓	✓
	Development	✓	✓		✓	✓
	Recreation					
Preferred Alternative	Mining	✓	✓		✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓		✓	✓
	Recreation					
Alternative One	Mining	✓	✓		✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓		✓	✓
	Recreation					
Alternative Two	Mining					
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓			
	Recreation					
Alternative Three	Mining	✓	✓		✓	✓
	Livestock grazing	✓				
	Cultivated Agriculture	✓	✓	✓	✓	✓
	Development	✓	✓		✓	✓
	Recreation					
Alternative Four	Mining	✓	✓		✓	✓
	Livestock Grazing					
	Cultivated Agriculture					
	Development	✓	✓		✓	✓
	Recreation					

* Checkmarks do not represent adverse impacts of comparable significance; refer to accompanying text for significance of impacts.

1 **Table 5-6. Potential Impacts of the Alternatives on Surface Water.**

2

Plan Map	Impacting Activity	Impacts to Surface Water (✓ = impact) ^a			
		Consumptive Use	Degradation by Point Sources	Degradation by Non-Point Sources	Degradation by Sediment Loading
3 4 No-Action Alternative	Mining			✓	✓
	Grazing	✓			✓
	Agriculture	✓		✓	✓
	Development	✓	✓	✓	✓
	Recreation				
5 6 Preferred Alternative	Mining	✓		✓	✓
	Grazing				
	Agriculture				
	Development	✓	✓	✓	
	Recreation				
7 Alternative One	Mining				
	Grazing				
	Agriculture				
	Development	✓	✓		
	Recreation				
8 Alternative Two	Mining				
	Grazing				
	Agriculture				
	Development		✓	✓	
	Recreation				
9 10 Alternative Three	Mining				
	Grazing	✓			✓
	Agriculture	✓		✓	✓
	Development	✓	✓	✓	
	Recreation				
11 Alternative Four	Mining				
	Grazing				
	Agriculture				
	Development	✓	✓	✓	
	Recreation				

12 ^a Checkmarks do not represent adverse impacts of comparable significance; refer to accompanying text for
13 significance of impacts.

14
15
16 **5.2.2.2 Preferred Alternative.** Under the Preferred Alternative, mining operations could occur
17 throughout much of the All Other Areas geographic area and on a portion of the ALE Reserve.
18 Potential impacts to water resources as a result of mining operations would be similar to the
19 potential impacts described for the No-Action Alternative.

20
21 The Preferred Alternative would allow industrial development in the eastern and southern
22 portions of the Hanford Site. As with the No-Action Alternative, industrial development under

1 this alternative could alter groundwater flows through increased withdrawals. Industrial
2 discharges to the soils column could mobilize contaminants in the vadose zone and accidental
3 releases from industrial sites could contaminate the groundwater or the Columbia or Yakima
4 Rivers. The potential for immediate contamination of the Columbia River is limited, however, as
5 the 300 Area is the only Industrial land-use designation adjacent to the river under this
6 alternative.
7

8 Recreational access to the Columbia River would be increased under the Preferred
9 Alternative through adding new boat ramps and upgrading existing boat ramps. The Preferred
10 Alternative would add three new access points to the Hanford Reach of the Columbia River, and
11 would allow development of tribal fishing villages with supporting facilities. Increased access
12 could increase boating activity on the river, which could increase shoreline erosion from wakes
13 generated by motorized water craft. Increased boating activity could also generate additional
14 pollutants (e.g., oil, gas, and engine exhaust).
15

16 **5.2.2.3 Alternative One.** Under Alternative One, mining would be limited to upland areas away
17 from the Columbia River, and would have minimal affects on water quality.
18

19 Industrial development under Alternative One would be restricted to areas that have
20 already been developed, the City of Richland urban growth area (UGA), and an area between
21 the Energy Northwest (formerly known as the Washington Public Power Supply System, or
22 WPPSS) site and the City of Richland UGA. Industrial development in these areas could have
23 impacts such as those described for the Preferred Alternative, including changes in groundwater
24 flows through drawdowns and groundwater contamination through accidental releases.
25 However, these impacts are less likely to occur under Alternative One, as less land would be
26 available for industrial development. Contamination of surface water from new point sources
27 would be minimal under this alternative, as most areas designated for Industrial land use are
28 located away from the Columbia and Yakima Rivers.
29

30 Alternative One would increase recreational access to the Columbia River by adding one
31 new access point to the river at Vernita Bridge and maintaining an existing unimproved boat
32 ramp at White Bluffs. The increased access could have impacts to water quality such as those
33 described for the Preferred Alternative, although impacts under Alternative One may be less
34 extensive because it would not provide access to as many areas.
35

36 **5.2.2.4 Alternative Two.** Under Alternative Two, mining, commercial grazing, and agriculture
37 would not be allowed, and no impacts to water resources would occur as a result of these
38 activities.
39

40 Areas proposed for industrial development under this alternative include the City of
41 Richland UGA and areas that have already been developed. The potential for new impacts to
42 water resources under this alternative is minimal; however, Alternative Two would allow
43 experimental aqua-culture in the K Reactor area, and discharge of waste water from fish farming
44 activities could add to the nutrient load in the Columbia River.
45

46 Alternative Two would not increase recreational access to the Columbia River and is
47 unlikely to result in increased impacts to water quality from recreational uses.
48

49 **5.2.2.5 Alternative Three.** Alternative Three would allow mining activities in the All Other Areas
50 geographic area and on the ALE Reserve, with impacts to groundwater similar to those
51 described for the No-Action Alternative and the Preferred Alternative. Mining would not be
52 permitted within 400 m (0.25 mi) of the Columbia River, and would be unlikely to affect river
53 water quality.
54

55 Grazing under Alternative Three would be permitted in some areas on the Wahluke

1 Slope, including wetland areas associated with irrigation water return flows. Grazing could
2 reduce vegetation cover in wetlands and increase siltation in flows entering the Columbia River.
3 However, grazing under this alternative would not be allowed directly adjacent to the bank of the
4 Columbia River.

5
6 Alternative Three would allow cultivated agriculture on much of the Wahluke Slope but
7 would not allow agriculture within a corridor along the Columbia River. This buffer zone would
8 minimize the potential for non-point source runoff of agricultural chemicals and eroded soils into
9 the Columbia River. However, infiltration of agricultural chemicals could contaminate
10 groundwater underlying cropland, and agriculture on the Wahluke Slope could also alter
11 groundwater flow patterns. Increased groundwater recharge from irrigation would increase
12 slumping along the White Bluffs, reducing their scientific, aesthetic, and cultural value.
13 Increased slumping would add large quantities of sediment to the Columbia River, which could
14 bury salmonid spawning areas and would alter flow patterns in the river and could mobilize
15 contaminants, causing erosion of banks and islands.

16
17 Water resource impacts due to industrial development under Alternative Three would be
18 similar to those described for the Preferred Alternative and could include changes in
19 groundwater flow, mobilization of vadose zone contaminants, and possible groundwater and
20 surface water contamination through accidental releases.

21
22 Recreational development under this alternative could include a golf course and
23 destination resort on the Vernita Terrace. Runoff from parking lots and runoff or infiltration of
24 agricultural chemicals from the golf course could impact water resources. However,
25 development would not be permitted within 400 m (0.25 mi) of the Columbia River, which would
26 minimize the potential effects of runoff on river water quality. The recreational development
27 would involve consumption of large amounts of groundwater for culinary and sanitary uses at the
28 resort and for irrigation of the golf course. Groundwater wells at the destination resort could
29 result in changes in groundwater flows from aquifer drawdown, as well as possible groundwater
30 mounding under sewage treatment facilities.

31
32 Alternative Three would increase recreational access to the Columbia River, with
33 potential impacts from increased boating activity such as those described for the Preferred
34 Alternative. However, Alternative Three would concentrate the increased recreational activity on
35 the upper end of the Hanford Reach and at a location near the Yakima River. This could result
36 in water quality impacts with higher intensity in these areas, but lower intensity in the lower
37 portion of the Hanford Reach.

38
39 **5.2.2.6 Alternative Four.** As with Alternative One, Alternative Four would limit mining to upland
40 areas away from the Columbia River and would result in minimal impacts to water quality from
41 mining.

42
43 Water resource impacts due to industrial development under Alternative Four would be
44 similar to those described for the Preferred Alternative and could include changes to
45 groundwater flow from drawdown, mobilization of vadose zone contaminants, and possible
46 contamination from accidental releases. However, these impacts may be less likely to occur, as
47 less land would be available for industrial development.

48
49 Alternative Four would increase recreational access to the Columbia River by adding two
50 new access points to the river at White Bluffs and Vernita Bridge, which would be associated
51 with tribal fishing villages and support facilities. The increased access could have impacts to
52 water quality such as those described for the Preferred Alternative, although impacts under
53 Alternative Four may be less extensive because it would not provide access to as many areas.

1
2 **5.2.2.7 Mitigation Measures.** With the exception of the No-Action Alternative, the CLUP
3 policies and implementing procedures described in Chapter 6 would be used to screen
4 development proposals for Hanford Site lands. Some activities with the potential to impact water
5 resources would not be permitted by DOE and others would be required to incorporate mitigation
6 measures to reduce impacts. Mitigation measures that could reduce impacts to water resources
7 include the following activities.
8

- 9 • Minimizing the use of groundwater so that water withdrawal would not alter
10 groundwater flow and influence existing contamination plumes.
- 11
- 12 • Restricting irrigated agriculture on the Wahluke Slope, requiring hydrogeologic
13 studies, or requiring efficient irrigation methods to minimize the potential for
14 increased slumping of the White Bluffs.
- 15
- 16 • Designating "no wake" zones along the Columbia River in areas where the riverbank
17 is subject to erosion.
- 18
- 19 • Employing agricultural practices that minimize the use of pesticides, fertilizers, and
20 herbicides, thereby minimizing the potential for infiltration or runoff of these chemicals
21 to groundwater or surface water.
- 22
- 23 • Requiring a demonstration of no adverse affect on vadose zone contaminants or
24 contaminated groundwater plumes prior to allowing irrigation or industrial discharges
25 to the soil column.
- 26
- 27 • Employing agricultural practices that minimize soil erosion.
- 28
- 29 • Using silt fences around development sites to contain soil erosion around those sites
30 and minimize the potential for release of silt to surface water.
- 31
- 32 • Using soil stabilizing techniques around mining and development sites to contain
33 wind erosion.
- 34
- 35 • Implementing water conservation measures wherever possible to minimize water use.
- 36
- 37 • Implementing spill control and cleanup measures to minimize the risk of
38 contaminating water resources from accidental releases.
- 39
- 40 • Managing commercial grazing activities to minimize livestock access to wetlands and
41 riverbanks (e.g., development of off-stream water sources).
- 42
- 43 • Requiring a demonstration of no adverse impact on groundwater due to increased
44 infiltration and transportation of vadose zone contamination resulting from
45 development.
- 46

47 **5.2.3 Impacts to Biological Resources**

48

49 Sensitive biological resources are present on the Hanford Site in association with the
50 Columbia River, basalt outcrops with their talus slopes such as Gable Butte and Gable
51 Mountain, sand dunes, low elevation deep soils, and other unique features. Biological resources
52 considered for each alternative in this analysis include terrestrial vegetation and habitat,
53 especially habitats identified through consideration of plant communities of concern; wildlife and
54 wildlife habitat; aquatic species and habitat; wetlands; and biodiversity. The potential impacts of
55 activities allowed under the alternatives on these biological resources are identified in Table 5-7.

Table 5-7. Potential Impacts of the Alternatives on Sensitive Biological Resources.

Alternative	Impacting Activity	Impacts to Biological Resources (✓ = impact)				
		Terrestrial Vegetation and Habitat	Wildlife and Wildlife Habitat	Aquatic Species and Habitat ^a	Wetlands	Biodiversity
No-Action	Mining	✓	✓	✓	✓	
	Livestock grazing	✓	✓	✓	✓	✓
	Cultivated agriculture	✓	✓	✓	✓	✓
	Development	✓	✓	✓		✓
	Recreation					
Preferred Alternative	Mining	✓	✓	✓	✓	
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓			✓
	Recreation			✓		
Alternative One	Mining	✓	✓			
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓			
	Recreation			✓		
Alternative Two	Mining					
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓			
	Recreation					
Alternative Three	Mining	✓	✓			
	Livestock grazing	✓	✓	✓	✓	✓
	Cultivated agriculture	✓	✓	✓	✓	✓
	Development	✓	✓			✓
	Recreation			✓		
Alternative Four	Mining	✓	✓			
	Livestock grazing					
	Cultivated agriculture					
	Development	✓	✓			✓
	Recreation			✓		

^a Aquatic species and habitats includes creeks, springs, riparian, and riverine (deep water) habitat. Checkmarks do not represent adverse impacts of comparable significance; refer to accompany text for significance of impacts.

Biological resources at the Hanford Site are also classified by level of concern under BRMaP (DOE-RL 1996c). This analysis is focused on resources classified as BRMaP Levels II, III, and IV, defined as follows:

- Level II resources include Washington State Monitor 1 and 2 species and early successional habitats.
- Level III resources include Washington State candidate, sensitive, threatened, and endangered species, Federal candidate species, wetlands and deep-water habitats, and late-successional habitats.
- Level IV resources include Federal threatened and endangered species and those species proposed for listing, and rare habitats such as the White Bluffs, active and stabilized sand dunes, and basalt outcrops.

Table 5-8 presents the potential impacts on biological resources that have been defined in BRMaP as Levels II, III, and IV from activities allowed under the alternatives. The amount of acreage of each BRMaP level under each land-use designation is tabulated from GIS spatial data in Table 5-9.

5.2.3.1 No-Action Alternative. The No-Action Alternative would allow continued development of the All Other Areas geographic area on a project-by-project basis. Without a land-use plan in place, it is less likely that facility siting would be coordinated to share utility corridors and conserve space. Biological resources would be damaged in localized areas where future development occurred. Construction of new facilities would require surface clearing and grading, which would eliminate vegetation and wildlife habitat present on the construction site and allow weed species to become established. New utility corridors could fragment habitats. Scattered development under the No-Action Alternative could also increase the risk of wildfire, which could result in large-scale losses of habitat. Future industrial development under the No-Action Alternative could affect biological resources associated with BRMaP Levels II, III, and IV, as shown in Table 5-9.

The No-Action Alternative would not preclude development of quarries on basalt outcrops such as the Umtanum Ridge, Gable Mountain, and Gable Butte, which could damage sensitive habitats in these locations. This alternative would also allow sand and gravel quarrying in most of the All Other Areas geographic area, and could affect BRMaP Levels II, III, and IV resources. Because basalt and sand and gravel quarries are typically limited in size, it is unlikely that habitat losses would be large enough to affect biodiversity. Conversely, mining of topsoil for covering and reclaiming remediation sites could disturb large areas and could affect biodiversity. Under the No-Action Alternative, the McGee Ranch could be developed as a quarry site for remediation. Large-scale soil mining at McGee Ranch could affect the connection between the large tracts of shrub-steppe habitat on the Hanford Site and those on the Yakima Training Center to the west. Mining at McGee Ranch could eliminate the wildlife movement corridor between these areas and increase habitat fragmentation. Isolating these two habitat remnants could reduce the genetic diversity of plant and animal species associated with shrub-steppe habitat and reduce regional biodiversity in the long term.

Although the No-Action Alternative does not designate lands for cultivated agriculture, this alternative would not preclude future agricultural development of Hanford Site lands. Assuming that cultivated agriculture would be established near the Columbia River to facilitate irrigation, the conversion to cropland could displace rare plants, riparian plant communities, and other BRMaP Level III and IV resources associated with the free flowing Hanford Reach. Cultivated agriculture adjacent to the Columbia River would increase sediment loading to the river, potentially affecting salmonid spawning areas. Agricultural chemicals in runoff from croplands could damage sensitive wetland and aquatic habitats.

Table 5-8. Potential Impacts to Biological Resources as Defined by BRMaP.

Alternative	Activity	Impact to BRMaP Resource Level of Concern (✓ = impact) ^a		
		II	III	IV
No-Action	Mining	✓	✓	✓
	Livestock grazing	✓	✓	✓
	Cultivated agriculture	✓	✓	✓
	Development	✓	✓	✓
	Recreation			
Preferred Alternative	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	
	Recreation		✓	✓
Alternative One	Mining			✓
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	
	Recreation			
Alternative Two	Mining			
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	
	Recreation			
Alternative Three	Mining	✓	✓	✓
	Livestock grazing	✓	✓	✓
	Cultivated agriculture	✓	✓	✓
	Development	✓	✓	
	Recreation	✓	✓	✓
Alternative Four	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	
	Recreation		✓	✓

^a Checkmarks do not represent adverse impacts of comparable significance; refer to accompany text for significance of impacts.

Table 5-9. Distribution of BRMaP Level II, III, and IV Resources Under the Nine Land-Use Designations for the Alternatives. (2 pages)

Land-Use Designation	No-Action Alternative	Preferred Alternative	Alternative One	Alternative Two	Alternative Three	Alternative Four
BRMaP II						
Hectares (35,909 total)						
Preservation	1,113	3,297	24,414	34,427	381	13,664
Conservation (Mining)	0	15,940	10,806	0	14,309	13,462
Conservation (Mining & Grazing)	15,807	0	0	0	93	0
Industrial	18,840	11,590	538	744	12,495	4,610
Industrial-Exclusive	146	146	134	134	146	146
Research and Development	0	4,885	11	599	7,885	4,022
Low-Intensity Recreation	3	6	3	3	105	3
High-Intensity Recreation	0	45	2	0	355	1
Agriculture	0	0	0	0	139	0
BRMaP III						
Hectares (66,744 total)						
Preservation	26,857	44,096	61,306	61,539	3,548	56,842
Conservation (Mining)	0	16,833	209	0	37,096	4,166
Conservation (Mining & Grazing)	33,396	0	0	0	3,578	0
Industrial	1,108	385	75	260	706	310
Industrial-Exclusive	3,115	3,115	2,672	2,672	3,115	3,115
Research and Development	0	<1	194	4	13	<1
Low-Intensity Recreation	2,268	2,295	2,287	0	2,379	6
High-Intensity Recreation	0	19	<1	1	56	37
Agriculture	0	0	0	0	16,251	0
BRMaP IV						
Hectares (9,260 total)						
Preservation	7,180	7,895	7,905	9,260 ^a	1,178	9,260 ^a
Conservation (Mining)	0	0	0	0	6,450	0
Conservation (Mining & Grazing)	721	0	0	0	65	0
Industrial	4	0	0	0	0	0
Industrial-Exclusive	0	0	0	0	0	0
Research and Development	0	0	0	0	0	0
Low-Intensity Recreation	1,355 ^a	1,355 ^a	1,355 ^a	0	1,355 ^a	0

Table 5-9. Distribution of BRMaP Level II, III, and IV Resources Under the Nine Land-Use Designations for the Alternatives. (2 pages)

Land-Use Designation	No-Action Alternative	Preferred Alternative	Alternative One	Alternative Two	Alternative Three	Alternative Four
BRMaP II	Hectares (35,909 total)					
High-Intensity Recreation	0	<1	0	0	<1	0
Agriculture	0	0	0	0	211	0

* Area includes Columbia River surface area.

Although the No-Action Alternative would not preclude cultivated agriculture, mining, or industrial development adjacent to the Columbia River, such developments would have to be reviewed by the National Park Service for compatibility with the proposed Wild and Scenic River designation for the Columbia River. This review may prevent the siting of impacting activities near the river, and effectively provide protection of biological resources in the Columbia River Corridor under any of the alternatives being considered.

Grazing of livestock on the Wahluke Slope under the No-Action Alternative could alter terrestrial vegetation communities by eliminating or reducing the cover of some species, encouraging the growth of grazing-tolerant species, and providing opportunities for weed species to become established. These changes could adversely affect associated wildlife species. Cessation of grazing could increase the fire danger by providing flash and step fuel biomass such as cheatgrass that carries a range fire between brushy areas. Wetland and riparian plant communities could be damaged where livestock congregate near water sources.

Although the No-Action Alternative would continue to allow recreational use of the Hanford Reach, no new boat ramps or other recreational development would be planned. The No-Action Alternative is not likely to result in increased recreational impacts to biological resources associated with the Columbia River.

5.2.3.2 Preferred Alternative. Industrial development under the Preferred Alternative could disturb previously undisturbed land areas, including areas containing BRMaP Level II and III resources in the southern portion of the All Other Areas geographic area. Construction of new facilities would require surface clearing and grading, which would eliminate vegetation and wildlife habitat present on the construction site and provide opportunities for weed species to become established. Industrial development in the southeast portion of the Hanford Site would destroy dune stabilizing vegetation and encourage dune activation. The Preferred Alternative, through implementation of the CLUP's policies and implementing procedures (see Chapter 6), would mitigate the disturbance, encouraging the clustering of future developments and sharing of utility corridors, conserving space and minimizing disturbance. Industrial development under the Preferred Alternative would be less likely to fragment habitats or affect biodiversity than under the No-Action Alternative.

The Preferred Alternative would designate much of the All Other Areas geographic area for Conservation (Mining). In addition, a small portion of the ALE Reserve, which has been identified as an alternative basalt source, would be designated for Conservation (Mining). Biological resources located at quarry sites would be damaged or destroyed. The area in the ALE Reserve where mining would be permitted contains BRMaP Level I and II resources.

The Preferred Alternative would increase recreational access to the Columbia River by allowing additional boat launch facilities to be constructed. Increased boating activity on the river could adversely affect salmonid spawning areas, aquatic plant communities and other BRMaP Level III and IV resources. Development of biking and hiking trails and other recreational facilities

1 could also damage plant communities of concern, and disturb bald eagle roosts and great blue
2 heron rookeries along the Hanford Reach. With increased access, there would also be an
3 increase in the probability of a wildfire occurring.
4

5 The Preferred Alternative would assign the Preservation land-use designation to
6 approximately 53 percent (78,127 ha [193,056 ac]) of the Hanford Site, including the Wahluke
7 Slope, most of the ALE Reserve, the basalt outcrops, the McGee Ranch area, the shoreline of
8 the Columbia River, river islands, and the active sand dunes. The Preservation land-use
9 designation would protect approximately 66 percent (44,096 ha [108,964 ac]) of BRMaP Level III
10 and 85 percent (7,895 ha [19,509]) of BRMaP Level IV resources on the Hanford Site.
11

12 **5.2.3.3 Alternative One.** Industrial development under Alternative One would be allowed in
13 areas where development has already impacted sensitive habitats and in an area south of the
14 Energy Northwest (formerly known as WPPSS) site where cheatgrass dominates the vegetation
15 cover. These areas consist mainly of BRMaP Level I and II resources. Industrial development
16 under Alternative One would result in destruction of habitat, but the impacts would be less
17 extensive and to lower quality habitat than under the Preferred Alternative or the No-Action
18 Alternative because of the limited areas available for development.
19

20 Alternative One would minimize the area designated for Industrial-Exclusive use to
21 preserve the maximum amount of high-quality, late-successional shrub-steppe habitat located
22 west of the 200 West Area. An additional 443 ha (1,108 ac) of BRMaP Level III resources would
23 be protected under the Preservation land-use designation in this area, as compared to the
24 Preferred Alternative and the No-Action Alternative.
25

26 Under Alternative One, the Conservation (Mining) land-use designation would be assigned
27 to areas around LIGO and FFTF, and in other scattered locations in the 100 and 600 Areas.
28 Biological resources at many of these locations have been previously impacted and are classified
29 as BRMaP Level I and II. Other areas contain BRMaP Level III and IV resources that could be
30 damaged by basalt and sand and gravel quarrying. Impacts to these resources are less likely
31 than under the Preferred Alternative or No-Action Alternative, however, because mining under
32 Alternative One would be limited to supporting remediation activities.
33

34 Alternative One would increase recreational access to the Columbia River by allowing an
35 additional boat launch facility to be constructed. Increased boating activity on the river could
36 adversely affect biological resources associated with the Hanford Reach. Impacts would be less
37 extensive than under the Preferred Alternative because access would not be provided to as many
38 locations.
39

40 Alternative One would assign the Preservation land-use designation to approximately
41 84 percent (124,517 ha [307,688 ac]) of Hanford Site, including most of the ALE Reserve, the
42 basalt outcrops, the McGee Ranch area, the Saddle Mountain NWR, the entire Columbia River
43 Corridor, and the active and most stabilized sand dunes. The Preservation land-use designation
44 would protect approximately 92 percent (61,306 ha [151,490 ac]) of BRMaP Level III and
45 85 percent (7,905 ha [19,534 ac]) of BRMaP Level IV resources.
46

47 **5.2.3.4 Alternative Two.** Under Alternative Two, lands designated for industrial development
48 are mostly occupied by existing facilities, although some BRMaP Level II and Level III resources
49 are included under the Industrial and Research and Development land-use designations.
50 Industrial development under Alternative Two could result in destruction of habitat, but the
51 impacts would be less extensive than under any of the other alternatives being considered
52 because of the limited areas available for development. By limiting the amount of area to be
53 developed, Alternative Two (by land-use designation rather than by CLUP policies and
54 implementing procedures), advocates the clustering of future development.
55

1 Alternative Two, like Alternative One, would minimize the area designated for Industrial-
2 Exclusive use in order to preserve the maximum amount of high-quality, late-successional shrub-
3 steppe habitat located west of the 200 West Area. An additional 443 ha (1,108 ac) of BRMaP
4 Level III resources would be protected under the Preservation land-use designation in this area,
5 as compared to the Preferred Alternative and the No-Action Alternative.
6

7 Alternative Two would not increase recreational access to the Columbia River, and would
8 be unlikely to result in increased impacts to biological resources associated with the river.
9

10 Alternative Two would assign the Preservation land-use designation to approximately
11 95 percent (140,767 ha [347,843 ac]) of Hanford Site, including the ALE Reserve, Wahluke
12 Slope, Columbia River Corridor, and much of the All Other Areas geographic area. The
13 Preservation land-use designation would protect approximately 92 percent (61,539 ha
14 [152,066 ac]) of the BRMaP Level III and 100 percent (9,260 ha [22,882 ac]) of the BRMaP Level
15 IV resources.
16

17 **5.2.3.5 Alternative Three.** Under Alternative Three, the Industrial and Research and
18 Development land-use designations would be larger than under any of the other alternatives, but
19 would mainly consist of BRMaP Level I and II resources. Impacts to biological resources from
20 industrial development under Alternative Three would be similar to those described for the
21 Preferred Alternative.
22

23 Alternative Three would designate the ALE Reserve and much of the All Other Areas
24 geographic area as Conservation (Mining). Basalt and sand and gravel quarries developed in
25 these areas could impact rare plants and sensitive plant communities, depending on their relative
26 locations, but CLUP policies and implementing procedures would mitigate against such impacts.
27 Basalt and sand and gravel quarrying could affect BRMaP Level II, III, and IV resources.
28 Because basalt and sand and gravel quarries are typically limited in size, it is unlikely that habitat
29 losses would be large enough to affect biodiversity.
30

31 Under Alternative Three, lands in the Wahluke Slope could be converted to agriculture,
32 which would involve conversion of native plant communities to cropland, pasture land, and
33 orchards. Habitats of concern, including BRMaP Level II, III, and IV resources, would be
34 damaged or destroyed. Conversion of native plant communities to cropland would reduce
35 biodiversity by replacing complex plant communities with monocultures and allowing invasion of
36 non-native species. Biodiversity also could be affected on portions of the Wahluke Slope
37 designated for Conservation (Mining and Grazing), where livestock grazing could alter native
38 plant communities. Converting the Wahluke Slope to irrigated agriculture could accelerate the
39 collapse of the White Bluffs and destroy salmon spawning areas by siltation of the spawning
40 gravels in the Columbia River.
41

42 Alternative Three would allow High-Intensity Recreational development of the Vernita
43 Terrace, and Low-Intensity Recreational use of a large portion of the 100 Areas near the
44 Columbia River. Development of a destination resort at Vernita Terrace would impact mostly
45 BRMaP Level I resources, as this area consists of cheatgrass and abandoned fields.
46 Construction of Low-Intensity Recreational facilities, such as the proposed recreational trail along
47 the river, could result in habitat losses, including BRMaP Level II, III, and IV resources. However,
48 such trails and other facilities would be sited according to the CLUP policies and implementing
49 procedures to minimize impacts to BRMaP Level II, III, and IV resources. Increased recreational
50 access to the Columbia River under this alternative would increase boating activity and could
51 result in impacts to salmonid spawning areas, bald eagle roosts, great blue heron rookeries, and
52 aquatic plant communities. Increased access could also result in the increased probability of
53 wildfire. Recreational facilities would be located at least one-quarter mile from the river with Low-
54 Intensity access points.
55

1 Alternative Three would assign the Preservation land-use designation to approximately
2 6 percent (9,002 ha [22,244 ac]) of Hanford Site lands, primarily along the Columbia River
3 corridor. The Preservation land-use designation would protect approximately 5 percent (3,548 ha
4 [8,767 ac]) of BRMaP Level III and 13 percent (1,178 ha [2,911 ac]) of BRMaP Level IV
5 resources on the Hanford Site. As with the other alternatives being considered, Alternative Three
6 would also protect sensitive biological resources through the Conservation (Mining) land-use
7 designation with mining only by DOE's special-use permit, as described in Chapter 6 policies and
8 implementing procedures. Under Alternative Three, the Conservation (Mining) land-use
9 designation includes 56 percent (37,096 ha [91,666 ac]) of BRMaP Level III and 70 percent
10 (6,450 ha [15,938 ac]) of BRMaP Level IV resources on the Hanford Site.

11
12 **5.2.3.6 Alternative Four.** Alternative Four would allow industrial development in the City of
13 Richland UGA, in previously developed sites, such as Energy Northwest (formerly known as
14 WPPSS), FFTF, 300 Area, and undisturbed areas north of the City of Richland UGA, which
15 contain mainly BRMaP Level I and II resources. Construction of new industrial or R&D facilities
16 would require surface clearing and grading, which would eliminate vegetation and wildlife habitat
17 present on the construction site and provide opportunities for weed species to become
18 established. Industrial development in the southeast portion of the Hanford Site would destroy
19 dune stabilizing vegetation. Industrial development under Alternative Four would be less likely to
20 fragment habitats and affect biodiversity than the Preferred Alternative or Alternative Three,
21 because the areas available for development would be smaller, of lesser quality, and closer to
22 existing infrastructure.

23
24 Under Alternative Four, a portion of the All Other Areas geographic area and a small
25 portion of the ALE Reserve would be managed under the Conservation (Mining) land-use
26 designation. Lands within the ALE Reserve under this land-use designation are classified as
27 BRMaP Levels I and II. The portion of the All Other Areas geographic area available for mining
28 includes BRMaP Levels II and III resources. Basalt and sand and gravel quarries developed in
29 these areas could impact rare plants and sensitive plant communities, depending on their
30 location. Because basalt and sand and gravel quarries are typically limited in size and would be
31 permitted by DOE, it is unlikely that habitat losses would be large enough to affect biodiversity.

32
33 Alternative Four would increase recreational access to the Columbia River by adding two
34 new access points to the river at White Bluffs and Vernita Bridge, which would be associated with
35 tribal fishing villages and support facilities. The increased access could have impacts to
36 biological resources such as those described for the Preferred Alternative, although impacts
37 under Alternative Four may be less extensive because it would not provide access to as many
38 areas.

39
40 Alternative Four would assign the Preservation land-use designation to approximately
41 76 percent (112,321 ha [277,551 ac]) of Hanford Site, including the Wahluke Slope, the Columbia
42 River Corridor, most of the ALE Reserve, the basalt outcrops and active sand dunes, and other
43 portions of the All Other Areas geographic area. The Preservation land-use designation would
44 protect approximately 85 percent (56,842 ha [140,460 ac]) of BRMaP Level III and 100 percent
45 (9,260 ha [22,882 ac]) of BRMaP Level IV resources on the Hanford Site.

46
47 **5.2.3.7 Mitigation Measures.** With the exception of the No-Action Alternative, the CLUP
48 policies and implementing procedures described in Chapter 6 would be used to screen
49 development proposals for Hanford Site lands. All proposals, including the No-Action Alternative,
50 potentially affecting sensitive biological resources would be required to comply with applicable
51 statutes, such as the *Endangered Species Act of 1973*, the *Bald and Golden Eagle Protection Act*
52 *of 1972*, the *Migratory Bird Treaty Act of 1918*, and other statutes, Executive Orders, and policies
53 discussed in Chapter 7. Some activities with the potential to impact habitats of concern would not
54 be permitted by DOE and others would be modified or required by CLUP policies and

1 implementing procedures to incorporate mitigation measures to reduce impacts. Mitigation
2 measures that could reduce impacts to biological resources include the following:

- 3
- 4 • Minimize disturbance of wetlands and replace disturbed wetlands through purchase,
5 construction, or restoration of wetlands.
- 6
- 7 • Mitigation for remedial actions should occur near the site of the disturbance as a first
8 priority or, if that is not feasible, be performed as compensatory mitigation on areas
9 designated for Conservation or Preservation.
- 10
- 11 • Revegetate disturbed areas using native vegetation.
- 12
- 13 • Schedule activities to avoid critical nesting, roosting, leking, breeding, and fawning
14 times.
- 15

16 **5.2.4 Cultural Resources**

17
18 Impacts to cultural resources may include damage or destruction of archaeological and
19 historic sites and artifacts, as well as disruption of religious and traditional uses of the Hanford
20 Site by American Indians. Impacts of the alternatives on Hanford Site cultural resources are
21 summarized in Table 5-10.

22
23 **5.2.4.1 No-Action Alternative.** The No-Action Alternative would allow quarrying from basalt
24 outcrops that have traditional, cultural, and religious importance to American Indians. The
25 No-Action Alternative also would allow sand and gravel mining and industrial development in
26 most of the All Other Areas geographic area, which would alter the viewsheds associated with
27 religious sites. These activities and cultivated agriculture (which could be allowed under the No-
28 Action Alternative) could also displace natural resources traditionally gathered by American
29 Indians and disturb archaeological and historic sites. Ground-disturbing activities adjacent to the
30 Columbia River could also increase sediment loading to the Columbia River, which could damage
31 salmonid spawning areas and potentially affect American Indian fishing as a cultural activity.
32 Although the No-Action Alternative would not increase recreational access to the Columbia River,
33 archaeological sites would remain at risk to unauthorized artifact collection and riverbank erosion
34 from boat wakes.

35
36 **5.2.4.2 Preferred Alternative.** Although the Preferred Alternative would preclude quarrying of
37 basalt outcrops such as Gable Mountain and Gable Butte, mining of other areas could damage or
38 destroy archaeological and historic sites and displace natural resources traditionally gathered by
39 American Indians. Mining and industrial development could also affect viewsheds associated
40 with American Indian religious sites.

41
42 The Preferred Alternative would allow industrial development in the Central Plateau and in
43 the southeastern portion of the Hanford Site. Although these areas already include developed
44 sites (e.g., 200 Areas, Energy Northwest [formerly known as WPPSS], FFTF, and 300 Area),
45 large land areas remain that have not been disturbed. Development of these areas could result
46 in damage to or destruction of archaeological and historic sites and displacement of natural
47 resources traditionally gathered by American Indians.

48
49 The Preferred Alternative would increase recreational access to the Columbia River by
50 allowing additional boat launch facilities to be constructed. The Low-Intensity Recreation land-
51 use designation would also allow increased recreational use of the Vernita Terrace. Increased
52 recreational uses along the Columbia River could result in damage to natural resources
53 traditionally gathered by American Indians and impacts to archaeological and historic sites from
54 unauthorized artifact collection, vandalism, and erosion of riverbanks from boat wakes.

Table 5-10. Potential Impacts of Land-use Alternatives on Cultural Resources.

Alternative	Impacting Activity	Impacts to Key Cultural Resource Areas (✓ = impact) ^a				
		Religious Sites	Viewsheds	Natural Resource Gathering Areas	Archaeological and Burial Sites	Historic Sites
No-Action	Mining	✓	✓	✓	✓	✓
	Livestock grazing	✓		✓	✓	
	Cultivated agriculture		✓	✓	✓	✓
	Development		✓	✓	✓	✓
	Recreation				✓	
Preferred Alternative	Mining		✓	✓	✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development		✓	✓	✓	✓
	Recreation			✓	✓	✓
Alternative One	Mining		✓	✓	✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development				✓	✓
	Recreation			✓	✓	✓
Alternative Two	Mining					
	Livestock grazing					
	Cultivated agriculture					
	Development				✓	✓
	Recreation					
Alternative Three	Mining	✓	✓	✓	✓	✓
	Livestock grazing	✓		✓	✓	
	Cultivated agriculture		✓	✓	✓	✓
	Development		✓	✓	✓	✓
	Recreation			✓	✓	✓
Alternative Four	Mining		✓	✓	✓	✓
	Livestock grazing					
	Cultivated agriculture					
	Development			✓	✓	✓
	Recreation				✓	✓

^a Checkmarks do not represent adverse impacts of comparable significance; refer to accompany text for significance of impacts.

1 **5.2.4.3 Alternative One.** Under Alternative One, mining to support remediation would be
2 allowed in scattered locations in the All Other Areas geographic area. Although some
3 archaeological sites in these areas were previously disturbed by pre-Hanford farming or by
4 construction of Hanford Site facilities, cultural artifacts may remain that could be impacted by
5 mining. Mining in these areas could affect native plant communities and animals of importance to
6 American Indians. However, this impact is less likely to occur under Alternative One than under
7 the Preferred Alternative, because less land would be available for mining and much of it has
8 been previously disturbed.
9

10 Alternative One would limit the Industrial and Research and Development land-use
11 designations to the Central Plateau, Energy Northwest (formerly known as WPPSS) site,
12 300 Area, and the City of Richland UGA, where some archaeological and historic sites have
13 already been identified and mitigated. The Industrial land-use designation also includes an area
14 located south of the Energy Northwest (formerly known as WPPSS) site where cheatgrass
15 dominates the vegetation cover. Future industrial development in this area could disturb
16 archaeological or historic sites. Archaeological sites could also be disturbed by future
17 development under the Industrial-Exclusive land-use designation on the Central Plateau, although
18 Alternative One would protect more of these resources in the Central Plateau than would the
19 Preferred Alternative.
20

21 Alternative One would increase recreational access to the Columbia River by allowing an
22 additional boat launch facility to be constructed. Increased recreational uses along the Columbia
23 River could result in damage to natural resources traditionally gathered by American Indians and
24 impacts to archaeological and historic sites from unauthorized artifact collection, vandalism, and
25 riverbank erosion from boat wakes. These impacts would be less extensive under Alternative
26 One than under the Preferred Alternative, which would allow higher levels of recreational use.
27

28 **5.2.4.4 Alternative Two.** Industrial development under Alternative Two would be limited to the
29 Central Plateau, Energy Northwest (formerly known as WPPSS) site, 300 Area, and areas
30 adjacent to the City of Richland. Archaeological and historic resources in most of these areas
31 have already been identified and mitigated. New development in areas of the Central Plateau
32 could disturb additional sites, although Alternative Two would protect more of these resources in
33 the Central Plateau than would the Preferred Alternative. Alternative Two would designate most
34 of the Hanford Site for Preservation, which would minimize future impacts to cultural resources.
35

36 **5.2.4.5 Alternative Three.** Under Alternative Three, areas with known cultural resources,
37 including the ALE Reserve, could be affected by mining if permitted by CLUP policies and
38 implementing procedures. However, this alternative would not allow mining or other development
39 within 400 m (0.25 mi) of the Columbia River Corridor, where cultural resources are concentrated.
40 Mining, cultivated agriculture, and industrial development under this alternative could alter
41 viewsheds associated with religious sites used by American Indians.
42

43 Alternative Three would allow industrial and R&D in the Central Plateau and in the eastern
44 and southern portions of the Hanford Site. Although these areas already include developed sites,
45 such as the 200 Areas, Energy Northwest site, FFTF, and 300 Area, there remain large land
46 areas that have not been disturbed. Development of these areas could result in damage to or
47 destruction of archaeological and historic sites and displacement of natural resources traditionally
48 gathered by American Indians.
49

50 Alternative Three would allow conversion of much of the Wahluke Slope to croplands
51 under the Agricultural land-use designation. Conversion to croplands would involve removal of
52 native vegetation important to American Indians. Tillage of croplands would damage or destroy
53 archaeological and historic sites. Irrigated agriculture would increase slumping of the White
54 Bluffs, which have cultural significance to American Indians. Increased slumping could also

1 impact American Indian cultural fishing and other fishing and could alter the river channel,
2 causing losses of cultural resources to riverbank and island erosion.
3

4 Agricultural development and commercial grazing on the Wahluke Slope would also alter
5 native plant communities and displace animals of importance to American Indians.
6 Archaeological and burial sites could be damaged where livestock gather, such as at water
7 sources.
8

9 Alternative Three would increase recreational access to the Columbia River by
10 designating a large portion of the 100 Areas for Low-Intensity Recreation, as well as designating
11 the Vernita Terrace and the B Reactor area for High-Intensity Recreation. Development of
12 recreational facilities could damage archaeological and historic sites in these areas. Increased
13 recreational uses along the Columbia River could also result in damage to natural resources
14 traditionally gathered by American Indians and impacts to archaeological and historic sites from
15 unauthorized artifact collection, vandalism, and riverbank erosion from boat wakes. An area near
16 Horn Rapids on the Yakima River designated for High-Intensity Recreation could have similar
17 impacts to cultural resources and the culturally important viewshed.
18

19 **5.2.4.6 Alternative Four.** Alternative Four would allow mining that followed the CLUP's policies
20 and implementing procedures in support of remediation in the southern portion of the All Other
21 Areas geographic area. Mining in this area could alter viewsheds associated with religious sites
22 used by American Indians.
23

24 Alternative Four would designate southeastern portions of the Hanford Site for Industrial
25 and Research and Development uses. Although these areas already include developed sites
26 (e.g., Energy Northwest [formerly known as WPPSS], FFTF, and the 300 Area), other areas
27 under these designations have not previously been disturbed. Development of these areas could
28 result in damage to or destruction of archaeological and historic sites and displacement of natural
29 resources traditionally gathered by American Indians. These impacts would be less extensive
30 under this alternative than under the Preferred Alternative or Alternative Three because less land
31 would be available for development.
32

33 Alternative Four would increase recreational access to the Columbia River by allowing
34 additional boat launch facilities to be constructed. Increased recreational uses along the
35 Columbia River could result in impacts to archaeological and historic sites from unauthorized
36 artifact collection, vandalism, and riverbank erosion from boat wakes. These impacts may be
37 less extensive under Alternative Four than under the Preferred Alternative because this
38 alternative would not provide access to as many areas.
39

40 **5.2.4.7 Mitigation Measures.** With the exception of the No-Action Alternative, the CLUP
41 policies and implementing procedures described in Chapter 6 would be used by DOE to screen
42 development proposals for Hanford Site lands. Impacts of specific proposed projects would be
43 evaluated through the NEPA process including potential impacts on tribal member's treaty rights
44 and known archaeological and historic sites. Some projects may not be permitted and others
45 may be required to incorporate mitigation measures to reduce the impacts. Mitigation measures
46 that could reduce impacts to cultural resources include the following:
47

- 48 • Restrict irrigated agriculture on the Wahluke Slope, requiring hydrogeologic studies, or
49 requiring efficient irrigation methods to minimize the potential for increased slumping
50 of the White Bluffs.
- 51 • Continue to conduct cultural resource surveys of proposed project locations in
52 accordance with Neitzel et al. 1997.
53
54

- 1 • Continue to schedule activities to avoid conflicts with American Indian traditional and
2 religious uses.
- 3
- 4 • Continue to conduct consultations with the RL Cultural Resources Program Manager,
5 the State Historic Preservation Office, affected Tribal governments, and Wanapum
6 Band representatives to identify additional mitigation measures or project alternatives.
7

8 **5.2.5 Aesthetic Resources**

9
10 In this document, key aesthetic resources include viewing locations, viewsheds, visibility
11 (ambient air quality), odors, and ambient noise levels. Adoption of any particular alternative
12 would not directly impact aesthetic resources; however, activities allowed under the various
13 alternatives could have different affects on these resources.
14

15 Impacts of the alternatives on aesthetic resources are described in the following sections
16 and are summarized in Table 5-11. The primary impacts to aesthetic resources would occur as a
17 result of altering viewsheds through mining or development, visibility or odor impacts from release
18 of atmospheric pollutants from industrial activities, visibility impacts from releases of fugitive dust
19 from construction sites and seasonally from agricultural activities, and new noise impacts as a
20 result of development, mining, or recreation in areas that are typically quiet.
21

22 Under all alternatives, new development projects would be subject to a New Source
23 Review in accordance with the requirements of *Washington Administrative Code (WAC) 173-400*.
24 The New Source Review would identify probable air emissions and air emission control
25 technology would be required, if necessary, to comply with Washington State air-quality
26 thresholds.
27

28 **5.2.5.1 No-Action Alternative.** Under the No-Action Alternative, a quarry operation could be
29 developed on Gable Mountain or Gable Butte, affecting access to these viewing locations.
30 Mining and industrial development activities under this alternative could alter the viewsheds
31 associated with the basalt outcrops. These activities could be widely dispersed under the
32 No-Action Alternative and would stand out against the relatively undisturbed surrounding terrain.
33

34 Potential impacts to visibility under this alternative would occur as a result of temporary
35 releases of fugitive dust from construction sites, seasonal releases of fugitive dust from
36 agricultural fields, releases of fugitive dust during mining or quarrying operations, and from
37 releases of pollutants from developed sites.
38

39 Potential noise impacts under the No-Action Alternative would include blasting associated
40 with quarry operations, noise generated seasonally by agricultural machinery, and industrial noise
41 around new industrial sites. Depending on the location of the activities, these noise impacts
42 could detract from the recreation experience of recreationists on the Wahluke Slope and along
43 the Columbia River.
44

45 Commercial grazing by domestic animals could destroy wetland vegetation, create mud
46 holes, create obnoxious odors, create noise, and be a source of weed and insect pests. Grazing
47 could detract from the recreation experience of recreationists, including hikers, hunters, fishers,
48 and wildlife watchers using areas designated for Low-Intensity Recreation, Conservation, and
49 Preservation; and could disrupt wildlife.

Table 5-11. Potential Impacts of Land-Use Alternatives on Aesthetic Resources.

Plan Map	Impacting Activity	Impacts to Aesthetic Resources (✓ = impact)		
		Viewsheds	Ambient Visibility	Ambient Noise Levels
No-Action Alternative	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture	✓	✓	✓
	Development	✓	✓	✓
	Recreation			✓
Preferred Alternative	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	✓
	Recreation			✓
Alternative One	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture			
	Development		✓	✓
	Recreation			✓
Alternative Two	Mining			
	Livestock grazing			
	Cultivated agriculture			
	Development		✓	
	Recreation			
Alternative Three	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture	✓	✓	✓
	Development	✓	✓	✓
	Recreation	✓		✓
Alternative Four	Mining	✓	✓	✓
	Livestock grazing			
	Cultivated agriculture			
	Development	✓	✓	✓
	Recreation			✓

Checkmarks do not represent adverse impacts of comparable significance; refer to accompany text for significance of impacts.

5.2.5.2 Preferred Alternative. Under the Preferred Alternative, viewing locations associated with basalt outcrops and the ALE Reserve would not be disturbed. Viewing locations associated with the Columbia River could be disrupted through development of a mining operation outside a quarter mile from the river. Mining operations would also be permitted within the viewsheds of basalt outcrops. An area designated for Industrial use is within the viewshed of Gable Mountain. Impacts to visibility could include releases of fugitive dust from construction sites and pollutants from new industrial sites.

Noise impacts under the Preferred Alternative could include blasting during quarry operation, increased noise in the vicinity of new industrial sites, and noise from increased motorized watercraft use on the Columbia River. The increased noise levels from these activities could detract from the recreation experience of recreationists, including hikers, hunters, fishers,

1 and wildlife watchers using areas designated for Low-Intensity Recreation, Conservation, and
2 Preservation; and could disrupt wildlife.
3

4 **5.2.5.3 Alternative One.** Under Alternative One, viewing locations associated with basalt
5 outcrops, the Columbia River, and the ALE Reserve would be protected. Mining operations
6 would be permitted within the viewshed of Gable Mountain, but with the exception of the
7 200 Areas, only limited industrial development would be permitted within the viewshed. Visibility
8 impacts could include emissions of fugitive dust from mining operations and construction sites,
9 along with potential emissions of pollutants from industrial activities.
10

11 Noise impacts under Alternative One could include blasting during quarry operation,
12 increased noise in the vicinity of new industrial sites, and noise from increased motorized
13 watercraft use on the Columbia River. Because areas designated for development are in close
14 proximity to previously developed areas, new noise sources are not likely to affect previously
15 quiet areas. Noise from blasting and from recreational activities along the Columbia River could
16 affect some areas that are presently quiet, detracting from the recreation experience of
17 recreationists and potentially disrupting wildlife.
18

19 **5.2.5.4 Alternative Two.** Alternative Two would allow minimal new development on the Hanford
20 Site, protecting existing viewing locations and viewsheds. New industrial development could
21 occur in the City of Richland UGA, but would have minimal visibility and noise impacts to
22 recreationists.
23

24 **5.2.5.5 Alternative Three.** Alternative Three would allow quarrying operations on basalt
25 outcrops and mining on the ALE Reserve, which could affect access to viewing locations.
26 Viewing locations associated with the Columbia River would remain unaffected. The viewshed
27 from the basalt outcrops and from points along the Columbia River could be altered by develop-
28 ment of agriculture on the Wahluke Slope and mining and industrial development on other
29 portions of the Hanford Site. Agricultural development of the Wahluke Slope would replace
30 natural vegetation mosaics with ordered rectangular, linear, and circular patterns associated with
31 irrigated cropland and orchards.
32

33 Visibility impacts could include fugitive dust from mining and quarrying operations,
34 seasonal releases of particulates from farming activities, releases of fugitive dust from
35 construction sites, and releases of pollutants from new industrial sites.
36

37 Noise impacts associated with this alternative could include blasting in support of quarry
38 operations, noise from agricultural machinery, industrial noise in developed areas, and increased
39 noise associated with motorized watercraft on the Columbia River. The new noise sources could
40 affect some areas that are presently quiet, detracting from the recreation experience of
41 recreationists and potentially disrupting wildlife.
42

43 Commercial grazing by domestic animals could destroy wetland vegetation, create mud
44 holes, create obnoxious odors, create noise, and be a source of weed and insect pests. Grazing
45 could detract from the recreation experience of recreationists, including hikers, hunters, fishers,
46 and wildlife watchers using areas designated for Low-Intensity Recreation, Conservation, and
47 Preservation; and could disrupt wildlife.
48

49 **5.2.5.6 Alternative Four.** Alternative Four would protect viewing locations at basalt outcrops, on
50 the ALE Reserve, and along the Columbia River. Mining activities in the south-central portion of
51 the Hanford Site could alter viewsheds associated with basalt outcrops. Impacts to visibility could
52 include releases of fugitive dust from construction sites and pollutants from new industrial sites.
53

54 Noise impacts under Alternative Four could include blasting during quarry operation,
55 increased noise in the vicinity of new industrial sites, and noise from increased motorized

1 watercraft use on the Columbia River. The increased noise levels from these activities could
2 detract from the recreation experience of recreationists and could disrupt wildlife.
3

4 **5.2.5.7 Mitigation Measures.** With the exception of the No-Action Alternative, the CLUP
5 policies and implementing procedures described in Chapter 6 would be used to screen
6 development proposals for Hanford Site lands. Proposed projects would be planned to be
7 consistent with the CLUP policies requiring protection of natural and cultural resources. This
8 planning effort would include consideration of aesthetic resources. Potential mitigation measures
9 for aesthetic resources include:

- 10 • Implementing dust control measures, such as spraying water or other dust
11 suppressants, on construction, excavation, and quarry sites to reduce emissions of
12 fugitive dust.
- 13 • Covering loads when hauling materials away from construction or excavation sites.
14
- 15 • Siting development or mining activities in areas with the least impact on the viewshed
16 from basalt outcrops with their talus slopes, such as Gable Butte and Gable Mountain.
17
- 18 • Minimizing noise impacts to wildlife by restricting activities that generate noise to
19 seasons when sensitive wildlife would be disrupted the least.
20
- 21 • Limiting grazing timing, grazing rotation, and grazing areas to protect aesthetic
22 resources.
23
- 24
- 25
- 26

27 **5.3 Socioeconomic**

28 **5.3.1 Socioeconomic Impacts**

29 The study area used for the purpose of socioeconomics analysis includes Benton,
30 Franklin, and Grant counties.
31

32 **5.3.1.1 No-Action Alternative.** Under the No-Action Alternative, a land-use plan would not be
33 implemented, and facility planning and siting would continue on a project-by-project basis.
34 Because a land-use plan would not guide development, the potential socioeconomic impacts of
35 the No-Action Alternative cannot be readily predicted. The lack of a land-use plan that provides a
36 framework for DOE and local governments to work cooperatively may discourage multiple use
37 and transfer of Hanford lands. In the absence of a land-use plan, it is also unlikely that new
38 recreational opportunities would be developed that would generate economic benefits. However,
39 it can be assumed that this alternative would allow industrial development and R&D activities to
40 occur. Industrial development under the No-Action Alternative is likely to generate more
41 employment than Alternatives One or Two, but probably less employment than would the
42 Preferred Alternative or Alternative Three.
43

44 Under the No-Action Alternative, it is less likely facility siting would be coordinated to
45 share utility corridors and conserve space. The lack of a land-use plan could result in inefficient
46 use of existing infrastructure, with new infrastructure added on a project-by-project basis. In the
47 absence of a land-use plan, prioritization of infrastructure maintenance and improvements would
48 be more difficult and could result in higher costs to DOE and local governmental entities
49 responsible for infrastructure.
50

51 **5.3.1.2 Preferred Alternative.** Implementation of the Preferred Alternative would allow industrial
52 development, R&D initiatives, limited mining, and increased recreational uses on Hanford Site
53
54

1 lands. A total of 15,335 ha (37,894 ac) would become available for industrial development, which
2 would meet the estimated need forecasted by the Benton County Planning Department (1,639 ha
3 [4,050 ac]), and would provide an additional 13,696 ha (33,844 ac) to support possible future
4 DOE missions. This amount of land would allow the siting of several manufacturing facilities, with
5 a total employment of 1,000 or more. Lands under the Research and Development land-use
6 designation would total approximately 4,912 ha (12,138 ac), which could support at least
7 527,482 m² (5.9 million ft²) of facility space (including buildings, parking lots, and support
8 facilities) and total employment of up to 100 employees.
9

10 Future industrial development on Hanford Site lands would require additional support
11 infrastructure, such as roads and utilities. The City of Richland, in its Comprehensive Plan (COR
12 1997), anticipates industrial development in its UGA¹, which includes Hanford's 300 Area, and a
13 portion of the Hanford Site north of the city limits. The Comprehensive Plan was prepared with
14 the assumption that all industrial development within the 20-year planning period would be
15 accommodated by land already available within the UGA. The Comprehensive Plan describes
16 the city's plans for addressing additional infrastructure needs anticipated in the UGA during the
17 planning period.
18

19 The City of Richland's Comprehensive Plan (pp. 3-17, and 3-19 through 3-22)
20 (COR 1997) indicates that growth exceeding the City's projections could result in reduced levels
21 of service in the city's infrastructure, including the transportation system, waste water facilities,
22 water supply, solid waste management, and electrical power supply. If industrial development
23 under the Preferred Alternative expanded beyond the UGA, the development could exceed the
24 City's capacity to provide supporting infrastructure. Existing Hanford Site infrastructure could
25 meet at least some of the increased demand. Improvements to the existing infrastructure may
26 have to be financed through other governmental or public entities, such as Benton County or the
27 Port of Benton, to encourage industrial development on Hanford Site lands.
28

29 The Preferred Alternative would make some of the Hanford Site available for mining under
30 the Conservation (Mining) land-use designation. The Preferred Alternative would allow the
31 development of the existing natural gas claim held by the Big Bend Alberta Mining Company and
32 the filing of new claims for sand and gravel and natural gas development. However, the
33 Preservation land-use designation for the areas of the ALE Reserve surrounding those claims
34 would preclude construction of an access road to the claims, and could make future development
35 economically unfeasible. Mineral development on other areas of the Hanford Site would depend
36 on the release of Hanford Site lands withdrawn from the public domain by DOE, the Bureau of
37 Land Management (BLM), and the BoR. The BoR-held lands on the Wahluke Slope are not
38 subject to mineral claims without the specific agreement of the BoR. The BoR does not
39 anticipate giving permission for extraction of building materials such as sand and gravel from its
40 lands on the Wahluke Slope. Because the restrictions placed on mineral development at the
41 Hanford Site are likely to discourage investment in mining claims, future mineral development is
42 unlikely to have impacts to the regional economy.
43

44 The Preferred Alternative would preclude basalt quarrying from basalt outcrops and soil
45 mining from the McGee Ranch. These locations have been identified as the most cost-effective
46 and technically feasible sources of geologic materials for remediation (see Appendix D). The
47 Conservation (Mining) land-use designation under the Preferred Alternative designates an area in
48 the ALE Reserve as an alternative basalt source. Alternative soil mining sites are also available
49 under the Conservation (Mining) land-use designation. Increased haul distances from quarries to
50 remediation sites would increase remediation costs under the Preferred Alternative, as compared
51 to the No-Action Alternative and Alternative Three.

¹ An urban growth area (UGA) is defined as an area designated by the county or city for the expansion of urban development and municipal jurisdiction.

1 Low-Intensity Recreation associated with the Vernita Terrace, and High-Intensity
2 Recreation use associated with boat launches and the B Reactor Museum, along with limited
3 recreational opportunities under the Conservation and Preservation land-use designations, could
4 have impacts on the economy in the study area. Because current access to the Columbia River
5 Corridor is effectively limited to the Wahluke Wildlife Recreation Area, increased access under
6 the Preferred Alternative could greatly increase use for sport fishing, recreational boating, and
7 other day uses. Assuming that increased access to the Columbia River Corridor would double
8 the amount of day use over levels at the Wahluke Wildlife Recreation Area, an additional \$1.4
9 million per year could be generated for the local economy in recreational tourism dollars.
10 Increased recreational use could increase employment in retail sporting goods, boat dealers,
11 recreational vehicle (RV) dealers, and hotels and motels in the study area. These service
12 industry jobs typically benefit the economically disadvantaged worker by providing more job
13 opportunities.
14

15 **5.3.1.3 Alternative One.** Implementation of Alternative One would expand the existing Saddle
16 Mountain NWR. According to the Washington Department of Fish and Wildlife (WDFW), wildlife
17 viewing is big business in Washington State. More than a third of the state's population
18 participates in wildlife viewing and those wildlife watchers spent nearly \$1.7 billion on the pursuit
19 in Washington in 1996. A report issued by the WDFW entitled, *The Economic Benefits of*
20 *Wildlife-Watching Activities in Washington*, found that wildlife watchers spent \$1.1 billion on
21 equipment purchases; \$509 million on trip-related expenses including food and lodging; \$106
22 million for land-use fees and rentals; and \$59 million for items such as magazines, books,
23 membership dues, and other items. Nationwide, Americans spent \$29.2 billion on wildlife in 1996
24 and if wildlife-watching were a company, nationally it would have ranked 23rd among Fortune 500
25 corporations. In Washington alone, wildlife-viewing activities in 1996 translated to nearly 8,000
26 jobs, sales tax of \$56.9 million, and destination tourism drawing about 270,000 out-of-state
27 visitors who spent nearly 6 million visitor-days. How much income the expanded refuge would
28 bring to the Hanford area is unknown at this time.
29

30 Alternative One would allow continued industrial development and limited recreational
31 uses on Hanford Site lands. A total of 2,542ha (6,281 ac) would become available for industrial
32 development, which would meet the estimated need forecasted by the Benton County Planning
33 Department (1,639 ha [4,050 ac]), and would provide an additional area to support possible future
34 DOE missions. This amount of land would allow the siting of several manufacturing facilities, with
35 a total employment of 100 to 1,000. Research and Development land uses would be limited to
36 the 300 Area and 400 Area, which are already developed. The economic impact of Research
37 and Development land use under Alternative One would depend on possible future uses for the
38 300 and 400 Areas facilities.
39

40 Alternative One would allow efficient use of existing infrastructure located in the 300 Area
41 and in the City of Richland UGA, but could require new infrastructure to develop the rectangular
42 area located south of the Energy Northwest (formerly known as WPPSS) site designated for
43 industrial use. This area is an "island" surrounded by lands designated Preservation, which could
44 make extension of utilities to the area difficult. Construction of utility corridors through
45 Preservation lands would require more project reviews and justification, resulting in increased
46 costs and extended schedules. Because Alternative One would convert other areas containing
47 existing infrastructure to the Preservation land-use designation, the existing infrastructure would
48 not be maintained and would lose its remaining economic value.
49

50 Alternative One would expand an existing Federal wildlife refuge. Because a wildlife
51 refuge would be expected to maintain high ecological values, there are various legal
52 requirements attached by the Federal and state governments that could have socioeconomic
53 impacts. A summary of possible socioeconomic impact drivers by resource area follows.
54

- 1 • **Air** -- For visibility protection, the *Clean Air Act of 1977* specifies that Federal wildlife
2 refuges over 10,000 acres can only be designated as Federal Class I or Federal Class
3 II air shed (CAA Section 162 and WAC 173-400).
- 4
- 5 • **Land** -- Any Dangerous Waste Management Unit boundary must be sited at least one-
6 quarter mile from state or federally designated wildlife refuges (WAC 173-303-282);
7 and, incinerator ash disposal facilities shall not be located in a state or federally
8 designated wildlife refuge (WAC 173-306-350).
- 9
- 10 • **Surface water** -- No degradation of existing sediment quality shall be allowed of
11 waters constituting an outstanding national resource, such as water of a wildlife refuge
12 (WAC 173-204-120).
- 13
- 14 • **Groundwater** -- Degradation shall not be allowed of high quality ground waters
15 constituting an outstanding national or state resource such as waters of a wildlife
16 refuge (WAC 173- 200-030)
- 17

18 Alternative One would reduce the amount of land designated Industrial-Exclusive as
19 compared to the No-Action Alternative, the Preferred Alternative, and Alternatives Three and
20 Four. This could limit future development of lands under this designation for future DOE
21 missions, and could have impacts on the future economic contribution of DOE activities.
22 However, GIS data indicate that only 38 percent of lands under this designation are currently
23 developed. Also, none of the reasonably foreseeable actions identified for the 200 Areas would
24 require lands that would not be available under Alternative One, indicating that sufficient lands
25 would remain available under the Industrial-Exclusive land-use designation to support future
26 development without adverse socioeconomic impacts.

27
28 Alternative One would allow the development of the existing natural gas claim held by the
29 Big Bend Alberta Mining Company, but would not allow the filing of new claims for sand and
30 gravel and natural gas development. Mining on the Hanford Site would be limited to obtaining
31 geologic materials to support remediation and maintaining existing sand and gravel quarries.
32 These mining activities are unlikely to have economic impacts in the study area.

33
34 Alternative One would allow High-Intensity Recreational uses at the B Reactor and Vernita
35 Bridge, where a new boat ramp would be constructed. Another unimproved boat ramp and other
36 Low-Intensity Recreational uses would also be allowed. Recreation under this alternative is likely
37 to have the greatest economic impact directly from ecotourism as a result of the expansion of the
38 existing Saddle Mountain NWR.

39
40 **5.3.1.4 Alternative Two.** Implementation of Alternative Two would allow limited industrial
41 development and limited recreational uses on Hanford Site lands. This alternative would have the
42 least economic potential of the alternatives being considered. A total of 1,830 ha (4,522 ac)
43 would become available for industrial development, which is 191 ha (472 ac) more than the
44 estimated need forecasted by the Benton County Planning Department (1,639 ha [4,050 ac]).
45 However, much of this land (which includes the Energy Northwest [formerly WPPSS], FFTF, and
46 lands adjacent to the city of Richland), is already developed. According to the GIS database,
47 673 ha (1,662 ac) or 32 percent of the Industrial land-use designation under Alternative Two is
48 already developed. Therefore, this alternative would not have sufficient vacant land to meet the
49 estimated future need or provide for possible future DOE missions.

50
51 The relatively small amount of vacant land designated for Industrial development under
52 this alternative would probably limit new industrial employment to less than 100. Research and
53 Development land uses under this alternative would be limited to existing uses at LIGO
54 (theoretical physics research), and the K Reactor Basins (aqua-culture). The number of
55 employees that could be supported would depend on possible future uses of these facilities. As

1 was described under Alternative One, Alternative Two would reduce the area available for
2 development under the Industrial-Exclusive land-use designation but is unlikely to have adverse
3 socioeconomic impacts.
4

5 As with the Preferred Alternative, Alternative Two would allow commercial development of
6 the existing natural gas claim on the ALE Reserve, but the Preservation land-use designation
7 would limit access. This alternative would preclude the development of any other geologic
8 resources on the Hanford Site. Geologic resources required to support remediation activities
9 would have to be obtained from locations off the Hanford Site, which could increase remediation
10 costs (see Appendix D).
11

12 Alternative Two would allow High-Intensity Recreation associated with the B Reactor
13 Museum, but would not increase recreational access to the river. Day use of the B Reactor area
14 would generate some economic benefits, but they would be substantially less than those
15 estimated for the recreational uses under the other alternatives.
16

17 As in Alternative One, an additional economic benefit may be realized from the
18 Preservation land-use designation, which could increase interest in the Hanford Site in the
19 ecotourism market. Interest in ecotourism, which focuses on pristine habitats and rare species, is
20 increasing. The preserved habitats and associated species at the Hanford Site could draw
21 additional visitors to the Site, and generate additional revenues. However, access would be
22 limited under Alternative Two and the Preservation areas would lack the additional legal
23 protection of being a NWR.
24

25 **5.3.1.5 Alternative Three.** Under Alternative Three, a total of 17,860 ha (44,133 ac) would
26 become available for industrial development, which would meet the estimated need forecasted by
27 the Benton County Planning Department (1,639 ha [4,050 ac]), and would provide an additional
28 16,221 ha (40,083 ac) to support possible future DOE missions. This amount of land would allow
29 the siting of several manufacturing facilities, with a total employment of 1,000 or more. Industrial
30 development on the Hanford Site could increase infrastructure demand, as described under the
31 Preferred Alternative.
32

33 Lands under the Research and Development land-use designation would total
34 approximately 8,177 ha (20,206 ac), of which approximately 20 percent would be occupied by
35 infrastructure, such as roads and utility corridors. The remaining land base would support at least
36 878,000 m² (9.7 million ft²) of facility space and total employment of 100 to 300 employees.
37

38 As with the Preferred Alternative, Alternative Three would allow the efficient use of
39 existing infrastructure on the Hanford Site, but could generate increased demand that could
40 exceed the capacity of the City of Richland. Improvements to the existing infrastructure may
41 have to be financed through other governmental or public entities, such as Benton County or the
42 Port of Benton, to encourage industrial development on Hanford Site lands.
43

44 Alternative Three would allow the development of the existing natural gas claim held by
45 the Big Bend Alberta Mining Company, and the filing of new claims for sand and gravel and
46 natural gas development. The Conservation (Mining) land-use designation on the ALE Reserve
47 would allow access to develop the existing natural gas claim, pending review and issuance of a
48 special-use permit, as described in Chapter 6. Alternative Three is more likely to result in
49 development of the existing natural gas claim than would the other alternatives being considered,
50 and could encourage further development of natural gas resources on and near the Hanford Site.
51 Mineral development on other areas of the Hanford Site would depend on the release of Hanford
52 Site lands withdrawn from the Public Domain, as described under the Preferred Alternative.
53

54 Alternative Three would not preclude basalt quarrying, if permitted by DOE, from basalt
55 outcrops such as Gable Mountain and Gable Butte, and soil mining from the McGee Ranch.

1 These locations have been identified as the most cost-effective and technically feasible sources
2 of geologic materials for remediation (see Appendix D). Alternative Three could reduce
3 remediation costs compared to the Preferred Alternative and Alternatives One, Two, and Four.
4

5 Alternative Three would allow cultivated agriculture, industrial development, R&D
6 initiatives, limited commercial grazing and mining, and High-Intensity Recreational uses within
7 designated areas of the Hanford Site. This alternative would have the highest potential for
8 economic development of the alternatives being considered. Under this alternative, lands on the
9 Wahluke Slope could be developed for growing irrigated crops, including small grains, potatoes,
10 hay, fruits, and vegetables, as well as livestock production. The economic impact of agricultural
11 development on former Hanford Site lands would depend on how much land is converted to
12 farmland, how much is irrigated, and what crops are grown. Table 5-12 summarizes the potential
13 economic impacts of agricultural development under several scenarios. Under these scenarios,
14 the total market value of agricultural products in the three counties could increase from 1.7 to
15 9.4 percent, corresponding to a range of \$16 million to \$88 million (using 1992 prices) in
16 additional revenues. This potential increase does not take into account the affect of increasing
17 production on the market for agricultural commodities. Alternative Three would allow livestock
18 grazing on 6,476 ha (16,003 ac) of the Wahluke Slope, increasing the total pasture land base in
19 the three counties by 2.5 percent. This acreage could support approximately 1,059 AUM, with a
20 value of approximately \$12,700.
21

22 High-Intensity Recreational development of the Vernita Terrace under Alternative Three
23 may include a destination resort with golf course, a boat launch, Tribal fishing facilities,
24 interpretive exhibits, and the B Reactor Museum. A destination resort and conference center
25 featuring a 350-unit hotel, RV parking, and a golf course could employ 200 to 400 persons. By
26 comparison, hotels and motels in the study area employed approximately 900 persons with a total
27 payroll of approximately \$9.4 million in 1995. A large destination resort located at Vernita Terrace
28 could generate an additional \$2 million to \$4 million in payroll, in addition to other revenues.
29 However, these possible benefits could have negative impacts on other hotels, motels, and
30 resorts in the area. In addition, a destination resort development at Vernita Terrace could also
31 require additional investment in infrastructure in the northwestern portion of the Hanford Site.
32

33 If future recreational developments under Alternative Three do not include a destination
34 resort, other developments could contribute to the economy. An RV park containing 100 spaces
35 and operating at 80 percent capacity for 200 days per year could generate approximately
36 \$1.3 million annually. A golf course serving 150 golfers per day and operating year-round could
37 generate approximately \$1.4 million annually. Increased access to the Columbia River Corridor
38 under this alternative could also generate revenues from sport fishing and other day uses that
39 would be similar to those estimated for the Preferred Alternative.
40

41 **5.3.1.6 Alternative Four.** Implementation of Alternative Four would allow continued industrial
42 development, R&D initiatives, limited mining, and recreational uses on former Hanford Site lands.
43 Alternative Four would increase the land base available for industrial and Research and
44 Development land uses in Benton County. A total of 6,881 ha (17,003 ac) would become
45 available for industrial development, which would meet the estimated need forecasted by the
46 Benton County Planning Department (1,639 ha [4,050 ac]) and would provide an additional
47 5,242 ha (12,953 ac) to support possible future DOE missions. This amount of land would allow
48 the siting of several manufacturing facilities, with a total employment of 100 to 1,000. Lands
49 under the Research and Development land-use designation would total 4,388 ha (10,843 ac),
50 which could support at least 522,000 m² (5.8 million ft²) of facility space and total employment of
51 up to 100 employees.
52

1 **Table 5-12. Potential Economic Impacts of Agricultural Development.**

2

3

Agricultural Economic Indicators for the Three-County Study Area	Scenario 1: Crop Mix with Grazing in Red Zone ^a	Scenario 2: Crop Mix Without Red Zone	Scenario 3: Specialty Crop Production with Grazing in Red Zone
	Percent Increase over Existing Conditions		
Agricultural land	2.5%	2.5%	2.5%
Cropland	2.1%	3.7%	2.1%
Irrigated land	4.5%	8.0%	4.5%
Land in vegetable crops	4.5%	8.0%	24%
Land in fruit orchards	4.5%	8.0%	24%
Pastureland	4.1%	0%	4.1%
Total market value of agricultural products	1.7%	3.0%	9.4%
Total market value of crops	2.1%	3.7%	12%
Total market value of livestock	4.1%	0%	4.1%
Total market value of specialty crops	4.5%	8.0%	24%

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15 a Red Zone refers to areas on the Wahluke Slope that may contribute to sloughing of the White Bluffs if used for agricultural purposes.

16

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18

19 As with the Preferred Alternative, Alternative Four would allow the efficient use of existing infrastructure on the Hanford Site, but could generate increased demand that could exceed the capacity of the City of Richland. Improvements to the existing infrastructure may have to be financed through other governmental or public entities, such as Benton County or the Port of Benton, to encourage industrial development on Hanford Site lands.

20

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24

25 Alternative Four would allow the development of the existing natural gas claim held by the Big Bend Alberta Mining Company, but would not allow the filing of new claims for sand and gravel and natural gas development. As with the Preferred Alternative, Alternative Four would limit access to the existing natural gas claim on the ALE Reserve. Mining elsewhere on the Hanford Site would be limited to obtaining geologic materials to support remediation. These mining activities are unlikely to have economic impacts in the study area.

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32 Alternative Four would provide increased boating access to the Columbia River by adding two new access points to the river at White Bluffs and Vernita Bridge. Recreation under this alternative is likely to have economic impacts such as increased revenues and employment, but these impacts would probably be less than those described for the Preferred Alternative.

33

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38 **5.4 Environmental Justice**

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40 The following discussion addresses environmental justice as related to the land-use alternatives being considered for the Hanford Site. Minority and low-income populations in the vicinity of the Hanford Site are identified, followed by a discussion of the impacts that the alternatives might have on these populations. Analysis of environmental justice concerns was based on a qualitative assessment of the impacts reported in other sections of Chapter 5. The analysis was performed to identify any disproportionately high and adverse human health or environmental impacts on minority or low-income populations within the zone of potential impact, and for tribal members that are beyond the 80 km (50 mi) radius from the 200 East Area but have reserved treaty rights on the Hanford Site. The evaluation considered potential impacts arising

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1 under each of the major impact categories evaluated in this EIS, including socioeconomics, water
2 resources, air resources, ecology, health and safety, and cultural resources.
3

4 **5.4.1 Demographic Analysis**

5
6 Demographic information obtained from the U.S. Bureau of Census was used to identify
7 minority populations and low-income communities within an 80-km (50-mi) radius surrounding the
8 200 East Area on the Hanford Site at the census block group level (Neitzel et al. 1997). For the
9 evaluation of environmental justice impacts, the area defined by this 80-km (50-mi) radius was
10 considered the zone of potential impact.
11

12 A total population of approximately 384,000 people reside within an 80-km (50-mi) radius
13 of the Hanford Site. The minority population within the area of impact consists of approximately
14 95,000 people and represents approximately 25 percent of the population in the assessment
15 area. The ethnic composition of the minority population is primarily Hispanic (approximately
16 80 percent) and American Indian (8 percent). Census block groups where the percentage of
17 minority persons within the population exceeds 25 percent are primarily located to the southwest
18 and northeast of the Hanford Site and within the City of Pasco, Washington (Neitzel et al. 1997).
19 However, several large census block groups (i.e., areas with low population density) with
20 populations consisting of between 25 and 50 percent minority persons border the Hanford Site on
21 the west, north, and east.
22

23 The low-income population within the 80-km (50-mi) area of impact represents
24 approximately 42 percent of households in the area of impact. Census block groups where the
25 percentage of the population below the poverty level exceeds 20 percent are principally located to
26 the southwest and north of the Hanford Site and within the City of Pasco, Washington
27 (Neitzel et al. 1997).
28

29 **5.4.2 American Indian Populations Near the Hanford Site**

30
31 Substantial American Indian populations are located within the 80-km (50-mi) assessment
32 area. Census block groups within the assessment area and composed primarily of American
33 Indian populations are primarily located on the Yakama Indian Reservation in Yakima County,
34 Washington. However, other American Indian populations located outside of the assessment
35 area also have an interest in the Hanford Site based on treaty rights (see Appendix A). Treaty
36 reserved Tribal fishing rights have been recognized as effective within the Hanford Reach. The
37 Tribes also have an interest in renewing traditional uses, such as gathering of foods and
38 medicines, hunting, and pasturing horses and cattle on Hanford Site lands (Yakama Nation, June
39 1, 1998, DOE CCN 059113).
40

41 Future opportunities of the tribal members to exercise reserved treaty rights are
42 dependent upon the health of the ecosystems. The Tribes assert that a treaty right to hunt, fish,
43 or gather plants is diminished (if not voided) if the fish, wildlife, or plants have vanished or are
44 contaminated to the extent that they threaten human health. These resources, particularly the
45 resources with cultural and religious connotations, do not have equivalent value for the general
46 population.
47

48 **5.4.3 Human Health Impacts**

49
50 Although adoption of a land-use plan for the Hanford Site would not have any direct
51 impacts on human health, each of the alternatives could indirectly affect human health,
52 depending on the land uses that are implemented. The contamination left at depth poses a
53 potential hazard to development.
54

1 Even facilities associated with Low-Intensity Recreation may increase human health risk
2 by increasing infiltration of natural precipitation above the expected parameters used in the
3 CERCLA risk estimation. Where vegetation is suppressed and ground covers are used (i.e.,
4 campgrounds), infiltration of precipitation could occur at a higher rate driving contaminants toward
5 groundwater, unless the increase in activities also increases soil compaction. Soil compaction
6 caused by camping activities could actually reduce the rate of infiltration in some areas by
7 reducing the number and size of water infiltration pathways in the soil.
8

9 The recently completed *Screening Assessment and Requirements for a Comprehensive*
10 *Assessment, Columbia River Comprehensive Impact Assessment (CRCIA)* (DOE 1998a)
11 evaluated both chemical and radiological health risk potential for a variety of Hanford Site use
12 scenarios. This assessment focused on the Columbia River and riparian zone and included
13 several Native American subsistence scenarios (e.g., subsistence resident, upland hunter, river-
14 focused hunter and fisher, gatherer of plant materials, and Columbia River island users). These
15 Native American scenarios were developed by a Native American representative on the CRCIA
16 team specifically for the CRCIA effort¹. Environmental measurements used for the CRCIA
17 analysis were based on data collected under DOE's environmental monitoring program from 1990
18 through 1996 and, as a consequence, would not necessarily reflect the future condition of the
19 Hanford Site, as these scenarios do not assume cleanup.
20

21 Even these current monitoring program data do not indicate that adverse health risks
22 would be associated with consumption of fish and game. The radiation dose received by a
23 person who subsisted on wild game and fish would be higher than the 2.2×10^{-3} mrem reported
24 as the "Sportsman Dose" in the *Hanford Site Annual Environmental Report* by Pacific Northwest
25 National Laboratory (PNNL). However, this incremental dose to natural background of
26 approximately 300 mrem would be unlikely to be sufficiently high to cause adverse health effects.
27

28 In the CRCIA Native American scenarios, people were assumed to live along the
29 Columbia River, to eat substantial quantities of food grown in the riparian zone, to eat fish and
30 wildlife from the river, and to drink seep water. These people who live a subsistence lifestyle
31 linked to a specific location would have a much larger potential exposure and, thus, estimated
32 health risk than other people who are more mobile and can trade for other food sources. Lifetime
33 health risks greater than 1×10^{-4} [1 in 10,000] were found for many sections of the river for
34 potential exposure to chromium, copper, strontium-90, uranium-238, lead, and tritium. However,
35 the source of the nonradioactive heavy metals (particularly copper and lead) may be from historic
36 mining operations upstream of Hanford (e.g., copper, silver, and gold mining in Idaho's
37 Clearwater River drainage). According to these analyses, potentially increased health risk is
38 possible if people were to move onto the Hanford Site and derive a large percentage of their daily
39 food intake from crops and animals grown or taken in the river's riparian zone. In most cases,
40 this higher risk is limited in extent to a few regions of highest contamination. Although many
41 cultural differences exist in the relative percentages of food types between the general population
42 and Native American populations, the common pathways of food and water consumption would
43 affect both groups.
44

45 Land-use designations such as Preservation, Conservation, Low-Intensity Recreation,
46 Industrial, and Research and Development are unlikely to contribute to increased health risk from
47 residual contamination because the current CERCLA RODs are written to either industrial or
48 residential exposure times and pathways. However, increased human health risk could be
49 associated with Agriculture and High-Intensity Recreation uses if the CLUP policies and
50 implementing procedures are not implemented with the land use designations.
51

¹ These scenarios are not the same as scenarios commonly used for determining health impacts at Hanford.

1 Adoption of a land-use plan for the Hanford Site could have direct impacts on human
2 health depending on the land uses that are implemented because of the associated changes in
3 types and durations of activities associated with a land-use designation (Table 5-13). For
4 example, currently the Hanford Site is used for Federal industrial activities. The Hanford Site has
5 an average annual fatality rate of 2.8 per 100,000 workers. The national average annual fatality
6 rate for private industry is 5.1 per 100,000 workers. The transfer jobs from the government to the
7 private sector statistically doubles the fatality risk for the average worker. By race, white workers
8 average annually 4.6 fatalities per 100,000 workers, black workers average annually 4.5 fatalities
9 per 100,000 workers and hispanic workers average annually 5.3 fatalities per 100,000 workers
10 (Table 5-13).
11

12 **5.4.4 No-Action Alternative**

13
14 Access restrictions would remain in effect under the No-Action Alternative and the
15 potential for health risks would be comparable to existing risk. Use of the Columbia River for
16 recreation would continue at levels comparable to current use. Minority or low-income individuals
17 may be more prone to use this resource for subsistence than might members of the general
18 population. Current uses of the Columbia River are not known to cause disproportionately high
19 and adverse human health impacts in any population and no such impacts would be expected to
20 occur as a result of the No-Action Alternative.
21

22 Development of Hanford Site lands would not be restricted by land-use designations
23 under the No-Action Alternative. Cultural resources of importance to American Indians located on
24 the Hanford Site, including Gable Butte and Gable Mountain, could be developed under this
25 alternative. The availability of these resources for development represents a potential
26 environmental justice impact to American Indians.
27

28 Prohibiting development of agriculture on the Wahluke Slope would also potentially impact
29 low-income and minority populations located to the north of the Hanford Site by limiting the
30 potential for new jobs in those areas. In general, lands on the Wahluke Slope are not presently
31 available for agricultural development and many jobs associated with agricultural practices are
32 not high wage opportunities. Consequently, the current management of the Wahluke Slope
33 would be unlikely to result in disproportionately high and adverse impacts to low-income or
34 minority populations.
35

36 **5.4.5 Preferred Alternative**

37
38 The Preferred Alternative would allow for increased access to Hanford Site lands and to
39 the Columbia River for Tribal members by allowing a High-Intensity Recreation Tribal fishing
40 camp at the White Bluffs boat launch on the Franklin County side (north) of the river and by
41 allowing a High-Intensity Recreation Tribal fishing camp near B Reactor on the Grant County side
42 (north) of the river. Private fishing, hunting and trapping activities have one of the highest fatal
43 accident rates at 137.7 fatalities per 100,000 workers (Table 5-13).
44

45 As described in CRCIA (DOE 1998a), increased use and access to the Hanford Site
46 would potentially increase exposure time to contaminated plants, air, soil, and water; and,
47 therefore, could also potentially increase health risk. This access would also provide increased
48 opportunity for subsistence consumption of fish taken from the Columbia River which could, in
49 turn, increase

Table 5-13. Annual Occupational Fatality Rates for Selected Occupations (1996).
(3 pages)

Number, percent, and rate of potential fatal occupational injuries by selected worker characteristics, industry, and occupation, 1996.

Characteristic	Fatalities		Employed ¹ (thousands)	Fatalities per 100,000 workers ²	Relative Standard error ³ (percent)
	Number	Percent			
TOTAL	6,112	100	127,997	4.8	.2
Employee Status					
Wage and salary workers	4,905	80	117,329	4.2	.2
Self-employed	1,207	20	10,668	11.1	1.1
Gender					
Men	5,605	92	69,329	8.1	.3
Women	507	8	58,668	0.9	.4
Age					
Under 16 years	27	--	--	--	--
16 to 17 years	43	1	2,648	1.6	2.2
18 to 19 years	124	2	3,941	3.1	1.8
20 to 24 years	440	7	12,532	3.5	1.0
25 to 34 years	1,336	22	32,579	4.1	.6
35 to 44 years	1,563	26	35,319	4.4	.5
45 to 54 years	1,226	20	25,550	4.8	.6
55 to 64 years	847	14	11,741	7.2	1.0
65 years and over	492	8	3,690	13.3	1.8
Not reported	14	--	--	--	--
Race					
White	5,047	83	108,805	4.6	.2
Black	617	10	13,789	4.5	.9
American Indian, Eskimo, and Aleut	35	1	--	--	--
Asian and Pacific Islander	163	3	--	--	--
Other	91	1	--	--	--
Not reported	159	3	--	--	--
Hispanic origin					
Hispanic	626	10	11,725	5.3	1.0
Industry					
PRIVATE INDUSTRY	5,521	90	108,472	5.1	.2
Agriculture, forestry, and fishing	798	13	3,505	22.2	1.9
Agricultural production, crops	335	5	1,025	31.3	3.5
Agricultural production, livestock	154	3	1,214	12.2	3.2
Agricultural services	171	3	1,189	14.3	3.2
Fishing, hunting and trapping	73	1	53	137.7	15.4
Mining	152	2	567	26.8	4.7
Coal mining	39	1	98	39.8	11.3
Oil and gas extraction	82	1	302	27.2	6.5
Construction	1,039	17	7,464	13.9	1.3
Manufacturing	715	12	20,434	3.5	.7
Food and kindred products	70	1	1,706	4.1	2.7
Lumber and wood products	203	3	794	25.6	4.0
Transportation and public utilities	947	15	7,248	13.1	1.3
Local and interurban passenger transit	78	1	503	15.5	5.0
Trucking and warehousing	511	8	2,451	20.8	2.3
Transportation by air	113	2	778	14.5	4.0
Electric, gas, and sanitary services	88	1	1,066	8.3	3.4
Wholesale trade	267	4	4,942	5.4	1.6
Retail trade	672	11	21,443	3.1	.7
Food stores	173	3	3,507	4.9	1.9

Table 5-13. Annual Occupational Fatality Rates for Selected Occupations (1996).
(3 pages)

Number, percent, and rate of potential fatal occupational injuries by selected worker characteristics, industry, and occupation, 1996.

Characteristic	Fatalities		Employed ¹ (thousands)	Fatalities per 100,000 workers ²	Relative Standard error ³ (percent)
	Number	Percent			
Automotive dealers and service stations	98	2	2,165	4.5	2.4
Eating and drinking places	166	3	6,483	2.6	1.4
Finance, insurance, and real estate	114	2	7,862	1.5	1.2
Services	767	13	35,008	2.2	.5
Business services	168	3	5,680	3.0	1.5
Auto repair, services, and parking	103	2	1,618	6.4	2.8
Not reported	50	1	--	--	--
GOVERNMENT	591	10	19,525	3.0	.8
Federal	178	3	4,583	3.9	1.6
State	127	2	5,150	2.5	1.5
Local	284	5	9,791	2.9	1.1
Managerial and professional specialty occupations	711	12	36,497	1.9	.5
Executive, administrative, and managerial occupations	437	7	17,746	2.5	.8
Managers, food serving and lodging establishments	75	1	1,383	5.4	3.0
Professional specialty	274	4	18,752	1.5	.8
Technical, sales, and administrative support occupations	761	12	37,683	2.0	.5
Technicians and related support occupations	163	3	3,926	4.2	1.8
Airplane pilots and navigators	100	2	114	87.7	10.5
Sales occupations	503	8	15,404	3.3	.9
Supervisors and proprietors, sales occupations	225	4	4,501	5.0	1.7
Cashiers	94	2	2,856	3.3	2.1
Administrative support occupations, including clerical	95	2	18,353	0.5	.8
Messengers	8	--	175	4.6	8.5
Service occupations	492	8	17,177	2.9	.8
Protective service occupations	248	4	2,187	11.3	2.4
Fire fighting and fire prevention occupations ⁴	37	1	270	13.7	6.8
Police and detectives	114	2	1,057	10.8	3.4
Guards	97	2	859	11.3	3.8
Farming, forestry, and fishing occupations	883	14	3,566	24.2	1.9
Farm occupations	569	9	2,212	24.8	2.4
Groundskeepers and gardeners, except farm	90	1	875	10.3	3.8
Forestry and logging occupations	134	2	108	124.1	10.8
Timber cutting and logging occupations	118	2	75	157.3	13.0
Fishers, hunters, and trappers	72	1	49	146.9	16.0
Fishers ⁵	72	1	47	153.2	16.4
Precision production, craft, and repair occupations	1,072	18	13,587	7.9	.9
Mechanics and repairers	282	5	4,521	6.2	1.6
Automobile mechanics and apprentices	35	1	889	3.9	3.8
Heavy equipment mechanics	38	1	156	24.4	9.0
Construction trades	592	10	5,108	11.6	1.5
Carpenters and apprentices	87	1	1,220	7.1	3.2
Electricians and apprentices	98	2	763	12.8	4.1
Electrical power installers and repairers	38	1	126	30.2	10.0
Painters, construction and maintenance	45	1	504	8.9	5.0
Plumbers, pipefitters, steamfitters, and apprentices	32	1	555	5.8	4.8
Roofers	61	1	197	31.0	8.0
Structural metal workers	52	1	61	85.2	14.4
Extractive occupations	87	1	130	66.9	9.8
Drillers, oil wells	22	--	22	100.0	23.9
Mining machine operators	28	--	39	71.8	18.0
Operators, fabricators, and laborers	2,006	33	18,197	11.0	.8
Machine operators, assemblers, and inspectors	218	4	7,874	2.8	1.2
Welders and cutters	62	1	605	10.2	4.6

Table 5-13. Annual Occupational Fatality Rates for Selected Occupations (1996).
(3 pages)

Number, percent, and rate of potential fatal occupational injuries by selected worker characteristics, industry, and occupation, 1996.

Characteristic	Fatalities		Employed ¹ (thousands)	Fatalities per 100,000 workers ²	Relative Standard error ³ (percent)
	Number	Percent			
Transportation and material moving occupations	1,154	19	5,302	21.8	1.5
Motor vehicle operators	913	15	4,025	22.7	1.7
Truck drivers	785	13	3,019	26.0	2.0
Drivers-sales workers	35	1	156	22.4	9.0
Taxicab drivers and chauffeurs	65	1	203	32.0	7.9
Water transportation occupations	42	1	69	60.9	13.5
Sailors and deckhands	33	1	25	132.0	22.5
Material moving equipment operators	177	3	1,093	16.2	3.4
Operating engineers	38	1	245	15.5	7.2
Excavating and loading machine operators	26	--	92	28.3	11.7
Industrial truck and tractor equipment operators	46	1	512	9.0	5.0
Handlers, equipment cleaners, helpers, and laborers	634	10	5,021	12.6	1.6
Construction laborers	291	5	809	35.7	3.9
Garbage collectors	21	--	43	48.8	17.1
Laborers, except construction	213	3	1,334	15.9	3.1
Military	123	2	1,289	9.5	--
Not reported	64	1	--	--	--

¹ The employment figures, except for military, are annual average estimates of employed civilians 16 years of age and older, from the Current Population Survey (CPS 1996). The resident military figure, derived from resident and civilian population data from the Bureau of the Census, was added to the CPS employment total.

² The rate represents the number of fatal occupational injuries per 100,000 employed workers and was calculated as follows: $(N/W) \times 100,000$, where N = the number of fatal work injuries, and W = the number of employed workers, as described in the previous footnote. There were 27 fatally injured workers under the age of 16 years that were not included in the rate calculations to maintain consistency with the CPS employment.

³ The relative standard errors of the CPS employment estimates can be used to approximate confidence ranges for the fatality rates. For example, a confidence range for the roofers rate can be approximated as follows: $31.0 \times .08 \times 1.6 = 4.0$, where 31.0 = the rate, .08 = the relative standard error (8.0 percent), and 1.6 = the factor for a 90 percent confidence level. The confidence range for this rate is 27.0 to 35.0 (31.0 plus or minus 4.0).

⁴ Includes supervisors.

⁵ Includes captains and other officers.

NOTE: The rates are experimental measures using CPS employment. Selected rate categories had 20 or more reported work injury fatalities in 1996 and 20,000 or more employed workers. Dashes indicate data not available or less than .5 percent. Totals for major categories may include subcategories not shown separately. Figures may not add to totals because of rounding.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1996.

the potential for adverse health effects from fish that have resided in contaminated water. As a percentage of their population, minority or low-income individuals may be more prone to adopt a subsistence lifestyle than might members of the general population and therefore any health impact would be disproportionate to the minority population. Avid sportsmen among the general population also could have an increased risk of health effects from increased exposure but would represent a smaller percentage of their population. Environmental measurements used for the CRCIA analysis were based on data collected from 1990 through 1996 and, as a consequence, would not necessarily reflect the future condition of the Hanford Site, as these scenarios do not assume cleanup. Therefore, although the CRCIA analyses used an increased access to and use of the Hanford Site as a basis for estimating health effects, the increased access due to this alternative is not expected to result in disproportionately high and adverse health effects in minority or low-income populations because of the institutional protections provided by the CLUP policies and implementing procedures.

The Preferred Alternative would designate Gable Mountain, Gable Butte, and other areas of cultural value to American Indians for Preservation. This designation would eliminate the potential for disproportionately high and adverse impacts due to development of culturally

1 significant areas. The Preferred Alternative would allow development within the viewscape of
2 these high promontories. Alteration of these viewscales would represent a potential
3 environmental justice impact to American Indians.
4

5 The Preferred Alternative would allow economic development of Hanford Site lands.
6 Low-income populations in the vicinity of the Hanford Site would benefit from increased economic
7 activity and growth in community services that could occur as a result of development. However,
8 economic development could increase the demand for housing and tend to decrease the
9 availability of low-income housing. In spite of these conflicting impacts, low-income populations
10 in communities that are influenced by development at the Hanford Site would probably benefit
11 from the development. Low-income communities located to the north and west of the Hanford
12 Site historically have not been strongly influenced by Hanford Site activities and the affects of
13 future development would probably be neutral in these communities.
14

15 Prohibiting development of agriculture on the Wahluke Slope would also potentially impact
16 low-income and minority populations located to the north of the Hanford Site by limiting the
17 potential for new jobs in those areas. In general, lands on the Wahluke Slope are not presently
18 available for agricultural development and many jobs associated with agricultural practices are
19 not high wage opportunities and have a higher average annual fatality rate of 31.3 fatalities per
20 100,000 workers (Table 5-13). Additionally, increased access to the Columbia River would allow
21 more fishing which has a high average annual fatality rate of 153 fatalities annually per 100,000
22 workers. The Preferred Alternative would be unlikely to result in disproportionately high and
23 adverse socioeconomic impacts to low-income or minority populations.
24

25 **5.4.6 Alternative One**

26
27 With the expansion of the existing Saddle Mountain NWR, more restrictions could be
28 placed on the consumptive use of natural resources. These restrictions placed to preserve the
29 natural resources could impact the exercise of treaty reserved rights that by their nature (e.g.,
30 hunting, fishing, pasturing of livestock etc.) consume the natural resources. Private fishing,
31 hunting and trapping activities have one of the highest fatal accident rates at 137.7 fatalities per
32 100,000 workers (Table 5-13).
33

34 Alternative One would allow increased access to Hanford Site lands and to the Columbia
35 River. As described in CRCIA (DOE 1998a), increased use and access to the Hanford Site would
36 potentially increase exposure time to contaminated plants, air, soil, and water; and, therefore,
37 could also potentially increase health risk. This access would also provide increased opportunity
38 for subsistence consumption of fish taken from the Columbia River which could, in turn, increase
39 the potential for adverse health effects from fish that have resided in contaminated water. As a
40 percentage of their population, minority or low-income individuals may be more prone to adopt a
41 subsistence lifestyle than might members of the general population and, therefore, any health
42 impact would be disproportionate to the minority population. Avid sportsmen among the general
43 population also could have an increased risk of health effects from increased exposure but would
44 represent a smaller percentage of their population. Environmental measurements used for the
45 CRCIA analysis were based on data collected from 1990 through 1996 and, as a consequence,
46 would not necessarily reflect the future condition of the Hanford Site, as these scenarios do not
47 assume cleanup. Therefore, although the CRCIA analyses used an increased access to and use
48 of the Hanford Site as a basis for estimating health effects, the increased access due to this
49 alternative is not expected to result in disproportionately high and adverse health effects in
50 minority or low-income populations because of the institutional protections provided by the CLUP
51 policies and implementing procedures.
52

53 Alternative One would limit development primarily to previously disturbed areas and to
54 areas of low habitat quality (BRMaP Levels I and II). This limitation to development could
55 constrain economic development in the vicinity of the Site, which would potentially affect low-

1 income individuals and communities to a greater degree than it would potentially affect the
2 general population. These impacts could include declining community services or increased
3 taxes which could place an greater burden on low-income households and communities than on
4 the population in general. This burden represents a potential disproportionately high
5 socioeconomic impact; however, most low-income communities within the analysis area are not
6 greatly influenced by development activities at the Site.
7

8 Prohibiting development of agriculture on the Wahluke Slope would also potentially impact
9 low-income and minority populations located to the north of the Hanford Site by limiting the
10 potential for new jobs in those areas. In general, lands on the Wahluke Slope are not presently
11 available for agricultural development and many jobs associated with agricultural practices are
12 not high wage opportunities. Consequently, Alternative One would be unlikely to result in
13 disproportionately high and adverse impacts to low-income or minority populations.
14

15 **5.4.7 Alternative Two**

16
17 Alternative Two would designate the majority of the Hanford Site for Preservation, and
18 would allow development in previously developed areas and in an area immediately north of the
19 city of Richland. The major difference between Alternative Two and Alternative One is that
20 Alternative Two would lack the Federal designation of wildlife refuge and therefore those natural
21 resources would not be considered "taken" because they had Federal protection greater than
22 normally found on Public Domain lands. Alternative Two would ensure that tribal treaty rights
23 could be enjoyed under the limits of the Preservation designation. Alternative Two would protect
24 cultural resources from Mining, and utilization of geologic resources on the Hanford Site would
25 not be allowed under this alternative. Economic development of Hanford Site land and resources
26 would be held to a minimum under this alternative.
27

28 Alternative Two would allow increased access to Hanford Site lands and to the Columbia
29 River. As described in CRCIA (DOE 1998), increased use and access to the Hanford Site would
30 potentially increase exposure time to contaminated plants, air, soil, and water; and, therefore,
31 could also potentially increase health risk. This access would also provide increased opportunity
32 for subsistence consumption of fish taken from the Columbia River which could, in turn, increase
33 the potential for adverse health effects from fish that have resided in contaminated water. As a
34 percentage of their population, minority or low-income individuals may be more prone to adopt a
35 subsistence lifestyle than might members of the general population and, therefore, any health
36 impact would be disproportionate to the minority population. Avid sportsmen among the general
37 population also could have an increased risk of health effects from increased exposure but would
38 represent a smaller percentage of their population. Environmental measurements used for the
39 CRCIA analysis were based on data collected from 1990 through 1996 and, as a consequence,
40 would not necessarily reflect the future condition of the Hanford Site, as these scenarios do not
41 assume cleanup. Therefore, although the CRCIA analyses used an increased access to and use
42 of the Hanford Site as a basis for estimating health effects, the increased access due to this
43 alternative is not expected to result in disproportionately high and adverse health effects in
44 minority or low-income populations because of the institutional protections provided by the CLUP
45 policies and implementing procedures.
46

47 Alternative Two would also minimize access to the Hanford Site through the Preservation
48 designation. This limited access would minimize the potential for environmental justice impacts to
49 American Indians that could occur as a result of potential damage to cultural and biological
50 resources under other alternatives.
51

52 Limitations to economic development under this alternative would potentially impact low-
53 income populations in the vicinity of the Hanford Site. These impacts could include declining
54 community services or increased taxes, which could in turn place an greater burden on low-
55 income households and communities than on the population in general. This burden represents

1 a potential disproportionately high socioeconomic impact; however, most low-income
2 communities within the analysis area are not greatly influenced by development activities at the
3 Site.
4

5 Prohibiting development of agriculture on the Wahluke Slope would also potentially impact
6 low-income and minority populations located to the north of the Hanford Site by limiting the
7 potential for new jobs in those areas. In general, lands on the Wahluke Slope are not presently
8 available for agricultural development and many jobs associated with agricultural practices are
9 not high wage opportunities. Consequently, the Preservation designation for the Wahluke Slope
10 would be unlikely to result in disproportionately high and adverse impacts to low-income or
11 minority populations.
12

13 **5.4.8 Alternative Three**

14
15 Alternative Three would allow increased access to Hanford Site lands and to the Columbia
16 River. As described in CRCIA (DOE 1998), increased use and access to the Hanford Site would
17 potentially increase exposure time to contaminated plants, air, soil, and water; and, therefore,
18 could also potentially increase health risk. This access would also provide increased opportunity
19 for subsistence consumption of fish taken from the Columbia River which could, in turn, increase
20 the potential for adverse health effects from fish that have resided in contaminated water. As a
21 percentage of their population, minority or low-income individuals may be more prone to adopt a
22 subsistence lifestyle than might members of the general population and, therefore, any health
23 impact would be disproportionate to the minority population. Avid sportsmen among the general
24 population also could have an increased risk of health effects from increased exposure but would
25 represent a smaller percentage of their population. Environmental measurements used for the
26 CRCIA analysis were based on data collected from 1990 through 1996 and, as a consequence,
27 would not necessarily reflect the future condition of the Hanford Site, as these scenarios do not
28 assume cleanup. Therefore, although the CRCIA analyses used an increased access to and use
29 of the Hanford Site as a basis for estimating health effects, the increased access due to this
30 alternative is not expected to result in disproportionately high and adverse health effects in
31 minority or low-income populations because of the institutional protections provided by the CLUP
32 policies and implementing procedures. Independent of risk due to residual contamination, private
33 fishing, hunting and trapping activities have one of the highest fatal accident rates at 137.7
34 fatalities per 100,000 workers (Table 5-13).
35

36 Activities associated with Alternative Three, such as agriculture, could result in damage to
37 cultural and biological resources of value to American Indian Tribes. Furthermore, if permitted by
38 DOE, Gable Butte and Gable Mountain could be available for development of quarries and mining
39 activities could be undertaken within the viewsheds of these high promontories. Disturbance of
40 the promontories or their viewsheds would be a disproportionately high and adverse
41 environmental impact to American Indians.
42

43 Alternative Three would allow for the maximum potential for economic development of
44 Hanford Site lands. Low-income populations in the vicinity of the Hanford Site would benefit from
45 increased economic activity and growth in community services that could occur as a result of
46 development. However, economic development could increase the demand for housing and tend
47 to decrease the availability of low-income housing. In spite of these conflicting impacts, low-
48 income populations in communities that are influenced by development at the Hanford Site would
49 probably benefit from the development.
50

51 Allowing agriculture on the Wahluke Slope would potentially provide a benefit to low-
52 income and minority populations located to the north of the Hanford Site by providing the potential
53 for new jobs in those areas. Many jobs associated with current agricultural practices are not high
54 wage opportunities and relatively dangerous with an average annual fatality rate of 31.3 fatalities
55 per 100,000 workers (Table 5-13), but increases in economic opportunities could be expected to

1 benefit local communities, including low-income and minority populations by increasing access to
2 health care and educational opportunities. Infrastructure costs would increase in proportion to
3 the number of low-wage jobs created and filled from outside the area. Disproportionately high
4 and adverse socioeconomic impacts to low-income or minority populations would be unlikely
5 under Alternative Three.
6

7 **5.4.9 Alternative Four**

8

9 Alternative Four would allow for increased access to Hanford Site lands and to the
10 Columbia River for Tribal members by allowing a High-Intensity Recreation Tribal fishing camp at
11 the White Bluffs boat launch on the Benton County side (south) of the river.
12

13 As described in CRCIA (DOE 1998), increased use and access to the Hanford Site would
14 potentially increase exposure time to contaminated plants, air, soil, and water; and, therefore,
15 could also potentially increase health risk. This access would also provide increased opportunity
16 for subsistence consumption of fish taken from the Columbia River which could, in turn, increase
17 the potential for adverse health effects from fish that have resided in contaminated water. As a
18 percentage of their population, minority or low-income individuals may be more prone to adopt a
19 subsistence lifestyle than might members of the general population and, therefore, any health
20 impact would be disproportionate to the minority population. Avid sportsmen among the general
21 population also could have an increased risk of health effects from increased exposure but would
22 represent a smaller percentage of their population. Environmental measurements used for the
23 CRCIA analysis were based on data collected from 1990 through 1996 and, as a consequence,
24 would not necessarily reflect the future condition of the Hanford Site, as these scenarios do not
25 assume cleanup. Therefore, although the CRCIA analyses used an increased access to and use
26 of the Hanford Site as a basis for estimating health effects, the increased access due to this
27 alternative is not expected to result in disproportionately high and adverse health effects in
28 minority or low-income populations because of the institutional protections provided by the CLUP
29 policies and implementing procedures. Independent of risk due to residual contamination, private
30 fishing, hunting and trapping activities have one of the highest fatal accident rates at 137.7
31 fatalities per 100,000 workers (Table 5-13).
32

33 Alternative Four would designate most of the Hanford Site for Preservation and this
34 designation would serve to protect cultural and biological resources of importance to American
35 Indian Tribes. Alternative Four would also designate presently undisturbed lands to the north
36 within the viewshed of Gable Butte and Gable Mountain for Preservation, leaving only the center
37 portion of the Hanford Site with potential to cause disproportionate adverse impacts to American
38 Indians.
39

40 Alternative Four would designate most of the Hanford Site for Preservation but would
41 allow for Mining, Research and Development, and Industrial uses. Sufficient area is available to
42 accommodate anticipated future development. Low-income populations in the vicinity of the
43 Hanford Site would benefit from increased economic activity and growth in community services
44 that could occur as a result of development. However, economic development could increase the
45 demand for housing and tend to decrease the availability of low-income housing. In spite of
46 these conflicting impacts, low-income populations in communities that are influenced by
47 development at the Hanford Site would probably benefit from the development. Low-income
48 communities located to the north and west of the Hanford Site historically have not been strongly
49 influenced by Hanford Site activities and the effects of future development would probably be
50 neutral in these communities.
51

52 Designating the Wahluke Slope for Preservation would potentially impact low-income and
53 minority populations located to the north of the Hanford Site by limiting the potential for new jobs
54 in those areas. In general, lands on the Wahluke Slope are not presently available for agricultural
55 development and many jobs associated with agricultural practices are relatively dangerous and

1 not high wage opportunities. Consequently, the Preservation designation for the Wahluke Slope
2 would be unlikely to result in disproportionately high and adverse impacts to low-income or
3 minority populations.
4
5

6 **5.5 Human Health Risk**

7

8 The alternatives being considered in this EIS were developed with the assumption that
9 human health risk associated with contamination at the Hanford Site will continue to be
10 addressed through the RCRA and CERCLA processes. These processes are expected to reduce
11 human health risk to acceptable levels through remedial actions and administrative controls, such
12 as deed restrictions, which are imposed by CERCLA Records of Decision (RODs). The DOE has
13 also assumed that future land uses would not be allowed until remediation has reduced human
14 health risk to levels acceptable for the intended land use.
15

16 Even though ongoing remedial actions at the Hanford Site are expected to reduce human
17 health risks to acceptable levels, health risk from residual contamination could affect future land
18 users at the Hanford Site. Continued migration of contaminant plumes in groundwater could
19 increase future risk levels in down-gradient areas that had previously been remediated to
20 acceptable risk levels. The Draft HRA-EIS (DOE 1996) addressed human health risk to future
21 populations by evaluating four exposure scenarios: residential, agricultural, industrial, and
22 recreational. The risk assessment evaluated the No-Action unrestricted-use alternative, which
23 involved cleanup to annual risk levels less than 1 in 1,000,000 (10^{-6}), two restricted-use
24 alternatives, and the exclusive-use alternative, which involved reducing annual risk levels to less
25 than 1 in 10,000 (10^{-4}).
26

27 The Hanford Site has an average annual accident fatality rate that has ranged from 4.9
28 (1994) to 2.8 (1997) per 100,000 workers. The national average annual accident fatality rate for
29 private industry in 1996 was 5.1 per 100,000 workers (Table 5-13) and Hanford was 4.3 per
30 100,000 workers. The transfer jobs from the government to the private sector statistically
31 doubles the annual accident fatality risk for the average worker in 1997. Some comparisons can
32 be made regarding occupational health risks among the land-use designations using statistics
33 from the U.S. Bureau of Labor Statistics (Table 5-13). The data in Table 5-13 indicate that the
34 riskiest occupation is logging with an annual fatality rate of 157.3 per 100,000 workers (equivalent
35 to a 10^{-3} risk). Industrial activities associated with Industrial, Industrial Exclusive, and Research
36 and Development have fatal accident annual rates that vary from administrative support
37 operations at 0.5 fatalities per 100,000 workers to, 4.1 fatalities per 100,000 workers for food
38 manufacturing workers, to 20.8 fatalities per 100,000 workers for trucking and warehousing
39 workers. The land-use designations of Preservation, Conservation (Mining), Conservation
40 (Mining and Grazing), Low-Intensity Recreation, High-Intensity Recreation have a different set of
41 occupational hazards associated with recreational activities. Fishing, hunting and trapping are
42 very risky occupations (second to logging) with an annual fatality rate of 137.7 fatalities per
43 100,000 workers. For sand and gravel mining operations, excavating and loading machine
44 operators annually have 28.3 fatalities per 100,000 workers. The Agriculture land-use
45 designation would expose workers to occupational fatality annual rates of 31.3 fatalities per
46 100,000 workers for crop production, 12.2 fatalities per 100,000 workers for livestock production
47 and 14.3 fatalities per 100,000 workers for agricultural services (Table 5-13).
48

49 Increased recreational opportunities associated with the Preferred Alternative and
50 Alternatives One, Three, and Four could increase accident risks associated with outdoor
51 recreation activities. These would include risks from boating and swimming accidents, hunting
52 and target shooting accidents, and bicycling accidents. Alternative Three would introduce the
53 relatively risky occupation of agriculture onto the Hanford Site. The DOE Preferred Alternative
54 and Alternative Three would best support the selection of some of the occupationally safer uses

of the Hanford Site such as manufacturing, managerial and administrative support functions.

5.6 Cumulative Impacts

This section summarizes potential cumulative impacts associated with Hanford Site land-use designations for each alternative identified in Chapter 3. Cumulative impacts result

... from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Reasonably foreseeable actions are identified and the relationship between these actions and the proposed land-use designations is discussed. The description of potential cumulative impacts couples impacts of each alternative with impacts from past and existing operations at the Hanford Site and impacts that may be associated with anticipated future actions.

Section 5.6.1 discusses potential cumulative impacts to land use associated with present and reasonably foreseeable actions; Section 5.6.2 discusses potential cumulative impacts to trustee resources; and Sections 5.6.3 and 5.6.4 discuss potential cumulative socioeconomic impacts and cumulative human health risk, respectively.

5.6.1 Cumulative Impacts to Land Use

The alternatives analyzed in this document would establish acceptable uses for Hanford Site lands for at least the next 50 years. The alternative identified and selected for implementation in the ROD would allocate lands for use under the defined land-use designations. Other present and reasonably foreseeable actions at the Hanford Site that involve siting new facilities or using Site resources also would, in effect, allocate lands for certain uses. Those present and reasonably foreseeable actions that involve land uses that are compatible with the proposed land-use designations under all the alternatives would not have cumulative impacts for land use; these actions are listed in Table 5-14 and described further in Appendix E. However, those present and reasonably foreseeable actions that do not conform with the proposed land-use designations would change the land-use allocations and, in this sense, could be considered to have potential cumulative impacts. Those present and reasonably foreseeable actions involving nonconforming uses are listed in Table 5-15.

The five actions listed in Table 5-15 could involve land uses that conflict with land-use designations under some alternatives. The USFWS is initiating a Comprehensive Conservation Plan (CCP) for the ALE Reserve. Assuming that the USFWS management plan would call for maintaining the ALE Reserve in its present, Preservation and Conservation type of management, the management plan would not conflict with any of the proposed land-use designations. If the USFWS plan only addresses preservation, then the proposed mining alternative on ALE, in lieu of the McGee Ranch mining area, would be in conflict with alternatives, Preferred, Four and Three.

A similar situation exists with the alternative selected in the ROD for the Hanford Reach (NPS 1996), which calls for designating the Wahluke Slope as an overlay wildlife refuge and designating the Columbia River Corridor on the Hanford Site (i.e., the Hanford Reach) as a Wild and Scenic Recreational River. These designations could result in the management of the Wahluke Slope

Table 5-14. Present or Reasonably Foreseeable Future Actions Compatible with Land-Use Designations under All Alternatives.

Present or Reasonably Foreseeable Future Action	Location	Land Use
Wild and Scenic River Designation for Hanford Reach	Hanford Reach	Preservation
Decommissioning of Eight Surplus Production Reactors	200 Areas (disposal)	Industrial-Exclusive
Deactivation of the N Reactor	200 Areas (disposal)	Industrial-Exclusive
Safe Interim Storage of Hanford Tank Wastes	200 Areas	Industrial-Exclusive
Tank Waste Remediation System	200 Areas	Industrial-Exclusive
Plutonium Finishing Plant Stabilization	200 Areas	Industrial-Exclusive
Decommissioning of Building 232-Z and Building 233-S	200 Areas	Industrial-Exclusive
Environmental Restoration Disposal Facility Expansion	200 Areas	Industrial-Exclusive
Spent Nuclear Fuel Management (current and projected)	200 Areas	Industrial-Exclusive
200 Area Effluent Treatment Facility	200 Areas	Industrial-Exclusive
Operation of 200 Areas LLW Burial Grounds	200 Areas	Industrial-Exclusive
Operation of U.S. Ecology Commercial LLW Burial Ground	200 Areas	Industrial-Exclusive
Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, and Central Waste Support Complex	200 Areas	Industrial-Exclusive
Tank 241-C-106 Sluicing and Waste Removal	200 Areas	Industrial-Exclusive
Special Case Waste Storage Facility	200 Areas	Industrial-Exclusive
Disposal of Decommissioned Naval Reactor Plants	200 Areas	Industrial-Exclusive
Environmental Molecular Sciences Laboratory	300 Area	Industrial, Research & Development (R&D)
Disposition of Sodium Test Loops	200 Areas, 300 Area	Industrial-Exclusive, Industrial, R&D
Fast Flux Test Facility	400 Area	Industrial, R&D
Disposal of S3G and D1G Prototype Reactor Plants	200 Areas	Industrial-Exclusive
Hanford Solid Waste EIS	200 Areas	Industrial-Exclusive
Offsite Thermal Treatment of Low-Level Mixed Waste	200 Areas, City of Richland	Industrial-Exclusive, Industrial, R&D
200 Area Emergency Facilities Campus	200 Areas	Industrial-Exclusive
300 Area Steam Replacement	300 Area	Industrial, R&D
Lead Test Assembly Irradiation and Analysis	200 Areas, 300 Area	Industrial-Exclusive, Industrial, R&D
Management of Hanford Site Non-Defense Production Reactor Spent Nuclear Fuel	200 Areas	Industrial-Exclusive
Relocation and Storage of Sealed Isotopic Heat Sources	200 Areas	Industrial-Exclusive
Trench 33 and 36 Widening in 218-W-5 LLW Burial Ground	200 Areas	Industrial-Exclusive
<i>Idaho High Level Waste and Facility Disposition Environmental Impact Statement (DOE/EIS-0287)</i>	200 Areas	Industrial-Exclusive
Implementation of Final Waste Management Programmatic EIS (DOE/EIS-0200) RODs	200 Areas	Industrial-Exclusive
Expansion of the Energy Northwest (formerly known as WPPSS) area industrial facilities (natural gas fired electric generator turbine or aluminum smelter)	600 Area	Industrial, R&D

Table 5-15. Present or Reasonably Foreseeable Future Actions with Nonconforming Land Uses.

Present or Reasonably Foreseeable Future Action	Nonconforming Land-Use Designations ✓ = nonconforming					
	No-Action	Preferred Alternative	Alternative One	Alternative Two	Alternative Three	Alternative Four
Development of a Comprehensive Conservation Plan for the ALE Reserve by the USFWS (Preservation)	N/A	✓ Conservation (Mining)			✓ Conservation (Mining)	✓ Conservation (Mining)
Designation of the Wahluke Slope as a National Wildlife Refuge (Preservation)	N/A				✓ Agriculture	
Operation of the Laser Interferometer Gravitational Wave Observatory (Research and Development)	N/A	✓ Conservation (Mining)	✓ Conservation (Mining)		✓ Conservation (Mining)	✓ Conservation (Mining)
Inert/Demolition Waste Landfill (Pit 9) (Industrial)	N/A		✓ Preservation	✓ Preservation		✓ Preservation
B-Reactor Museum (High-Intensity Recreation)	N/A					✓ Preservation

and the Columbia River Corridor as Preservation, Conservation or Agriculture depending on the USFWS's CCP and intent for establishing the refuge. The management of the Wahluke Slope as an overlay wildlife refuge could conflict with the Agriculture land-use designation under Alternative Three unless a purpose of establishing the refuge as defined in the USFWS's CCP included sharecropping for wildlife. The need to link agriculture to furthering the purposes of wildlife is the reason agriculture appears as a conflict in Table 5-15. Of the 181 NWRs with farming programs in 1989, 612 km² (233 mi²) of the 129 refuges were farmed by permittees who retained a share of the crop in return for costs incurred to farm the land. On the remaining refuges, Service personnel conducted farming operations with government equipment.

The remaining nonconforming uses listed in Table 5-15 involve present or upcoming actions that would conflict with land-use designations. The operation of LIGO would be considered a pre-existing, nonconforming use under Alternative One and Alternative Four, which could require that the LIGO site be restored to the designated use at the end of the facility's life. Operation of LIGO conflicts with Conservation mining designations because of the facility's sensitivity to vibrations. The Inert/Demolition Waste Landfill proposed for Pit 9 involves using an existing gravel pit located north of the 300 Area for disposal of inert and demolition wastes from the 300 Area. This would be classified as an Industrial land use, and would be considered a pre-existing, nonconforming use under Alternative One, Alternative Two, and Alternative Four. The proposed salvage and demolition of the 300 Area Steam Plant calls for obtaining fill from Pit 9 for filling voids and constructing the final cover. The use of Pit 9 for quarrying materials would be a pre-existing, nonconforming use under Alternative One, Alternative Two, and Alternative Four. The B-Reactor Museum would be in conflict with the Preservation designation of Alternative Four. Management and mitigation of these nonconforming land uses would be accomplished through the CLUP policies and implementing procedures as explained in Chapter 6.

5.6.2 Cumulative Impacts by Trustee Resource

5.6.2.1 Geologic Resources. Geologic resources on the Hanford Site include unique features that have been preserved while similar features in the region have been damaged or destroyed by development. Mining of geologic materials would be allowed under all alternatives being considered, except Alternative Two, and could damage or destroy unique geologic features,

1 such as Missoula Floods features and sand dunes. Mining under the No-Action Alternative and
2 Alternative Three, if permitted by DOE, could also impact basalt outcrops, such as Umtanum
3 Ridge, Gable Mountain, and Gable Butte. Because these features are rare and susceptible to
4 development elsewhere in the region, damage or destruction of these features on the Hanford
5 Site would increase their aesthetic and ecological value offsite, and decrease their availability
6 for scientific study.
7

8 Alternative Three would allow development of cultivated agriculture on the Wahluke
9 Slope. Increasing irrigated lands in the vicinity of the White Bluffs would cumulatively increase
10 groundwater recharge in the area and also could result in additional slumping of the White
11 Bluffs. Additional slumping of the White Bluffs would further reduce their aesthetic, historic, and
12 ecological value; would cumulatively increase sedimentation of the Columbia River; and could
13 accelerate riverbank and island erosion. The No-Action Alternative would also allow the
14 WDFW's current management practice of growing crops for wildlife management purposes on
15 the Wahluke Slope as long as the practice is compatible with the USFS's CCP.
16

17 **5.6.2.2 Water Resources.** Water resources on the Hanford Site, including groundwater and
18 surface water, have been impacted by past waste disposal practices at Hanford. Remediation
19 strategies for cleaning up past contamination are designed for current and predicted future
20 hydrologic conditions. Additional development on the Hanford Site could alter hydrologic
21 conditions, disrupt CERCLA ROD conditions, and increase impacts to water quality from
22 contamination.
23

24 Industrial development would be allowed under all alternatives being considered and
25 would increase groundwater consumption and alter groundwater hydrology. Changes to
26 groundwater hydrology as a result of aquifer drawdown and discharges to the soil column could
27 alter the rate of the movement of contaminants toward the Columbia River or in any other
28 direction. Groundwater recharge from industrial waste water discharges and collection and
29 infiltration of runoff in quarries could mobilize contaminants in the vadose zone and
30 cumulatively increase contaminant levels in groundwater.
31

32 The Preferred Alternative and Alternatives One, Three, and Four would increase
33 recreational use of the Columbia River over existing levels, which would cumulatively increase
34 levels of oil, gas, and engine exhaust discharged to the river; and increase riverbank and island
35 erosion from boat wakes. Unregulated non-point sources associated with industrial
36 development and mining could add to pollutants discharged to the river from upstream sources,
37 resulting in further water quality degradation. Mining and grazing along the Columbia River
38 Corridor, which would be allowed under the No-Action Alternative, would increase
39 sedimentation in the river, with possible cumulative impacts on spawning areas in the Columbia
40 River.
41

42 **5.6.2.3 Biological Resources.** Because the Hanford Site contains much of remaining
43 undisturbed Columbia Basin shrub-steppe habitat, proposed developments of undisturbed
44 areas would result in cumulative impacts to rare plants and animals, unique plant communities,
45 and terrestrial and aquatic ecosystems. In addition, the Hanford Site contains the last
46 unimpounded, nontidal segment of the Columbia River, and further development along the
47 Reach could result in cumulative losses to species and habitats associated with the Hanford
48 Reach. In some cases (e.g., Upper Columbia River spring run chinook salmon (Endangered
49 listed -3/99), Middle Columbia River steelhead (Threatened listed -3/99) and Upper Columbia
50 River steelhead [Endangered listed -8/97]), further losses of habitat could endanger remaining
51 populations.
52

53 The Industrial, Research and Development, and Industrial-Exclusive land-use
54 designations would allow industrial development to displace native plant communities and
55 wildlife habitats where the habitats still exist. In addition, ongoing remediation activities, such

1 as the decommissioning of surplus production reactors, would result in further habitat losses.
2 Many of the actions listed in Table 5-14 for the 200 Areas would involve small losses of habitat,
3 but expansion of the Environmental Restoration and Disposal Facility (ERDF) and other future
4 actions in the 200 Areas could involve larger losses, with potential cumulative impacts to shrub-
5 steppe habitat. Alternatives One and Two would limit potential cumulative impacts in the
6 200 Areas by reducing the size of the Industrial-Exclusive land-use designation.
7

8 The Conservation land-use designations could result in cumulative impacts by allowing
9 commercial livestock grazing and mining. Cumulative impacts from grazing are most likely
10 under the No-Action Alternative, which would allow grazing over the largest area and could
11 result in further losses of regional biodiversity.
12

13 Although basalt and sand and gravel quarries are unlikely to have cumulative impacts
14 because they would disturb relatively small areas, large-scale soil mining to support remediation
15 could result in large habitat losses. If permitted by DOE, the potential for cumulative effects
16 from mining are greatest under the No-Action Alternative and Alternative Three, which would
17 allow development of quarry sites at the McGee Ranch. Losses of shrub-steppe habitat in this
18 area could eliminate the remaining segments of the wildlife movement corridor between the
19 Hanford Site and the Yakima Training Center; which are among the last remaining large tracts
20 of shrub-steppe habitat in the region. Mining in the McGee Ranch area would add to habitat
21 fragmentation that has previously taken place in the region as a result of agricultural,
22 residential, and industrial development; and could further reduce regional biodiversity.
23

24 Increased recreational use associated with the Wild and Scenic River designation and
25 High- or Low-Intensity Recreation land-use designations under the Preferred Alternative and
26 Alternatives One, Three, and Four could result in cumulative impacts to wildlife and habitats
27 that are not currently accessible by the public under the No-Action Alternative. Recreation
28 designations would increase impacts from boating as well as foot traffic on sensitive plant
29 communities and habitats.
30

31 The potential for cumulative impacts to biological resources may best be evaluated by
32 determining the amount of BRMaP Level III and IV resources that could be affected. The
33 BRMaP Level III and IV designations identify the resources that could be most adversely
34 affected by further habitat losses. Alternative Three has the greatest potential to impact Level
35 III and IV resources, primarily because it would allow conversion of native plant communities on
36 the Wahluke Slope to cultivated agriculture. The Preferred Alternative and the No-Action
37 Alternative would have less potential for impacts to BRMaP Level III and IV resources, but are
38 more likely to impact those resources than Alternatives One, Two, or Four. Alternative Two is
39 least likely to have cumulative effects on biological resources, based on the amounts of BRMaP
40 Level III and IV resources that could be impacted by development.
41

42 **5.6.2.4 Cultural Resources.** Regionally, agricultural, industrial, and residential development
43 have damaged or destroyed cultural resources. In addition, construction of dams along the
44 Columbia River has inundated many cultural resources and sites of significance to American
45 Indian Tribes. Cultural resources on the Hanford Site have been preserved by access
46 restrictions for the past 55 years. Preservation of the Hanford Reach as the last free-flowing
47 stretch of Columbia River would also preserve cultural resources associated with the river.
48 Loss of these sites through development of Hanford Site lands could lead to potentially
49 significant impacts on the remaining cultural resources in the region.
50

51 The biological resources on the Hanford Site are also important to American Indian
52 Tribes for traditional subsistence uses. In addition, the Hanford Site includes religious sites
53 important to American Indians. American Indian Tribes with ties to the Hanford Site have long
54 advocated the protection of these resources in their efforts to maintain their cultures and

1 traditional life ways. Further losses of these resources could impact American Indian cultures
2 associated with the Hanford Site.

3
4 Potential cumulative impacts to cultural resources are most likely to occur along the
5 Columbia River, where cultural resources and traditional American Indian uses are
6 concentrated. The No-Action Alternative has the greatest potential to affect these resources by
7 allowing mining, grazing, or industrial development in the Columbia River Corridor. The
8 Preferred Alternative and Alternatives One, Three, and Four would increase recreational access
9 to the corridor, which could result in impacts to cultural resources from unauthorized artifact
10 collection, vandalism, and losses to riverbank and island erosion from boat wakes.

11
12 Industrial development under any of the alternatives has the potential to disturb
13 archaeological and historic sites. Alternatives One and Two are least likely to result in
14 cumulative impacts because these alternatives would minimize the amount of land designated
15 for Industrial, Research and Development, and Industrial-Exclusive land uses. Ongoing
16 remediation activities and some of the proposed projects listed in Table 5-15 could also have
17 cumulative effects on cultural resources.

18
19 Other potential cumulative impacts to American Indian cultures could occur under the
20 No-Action Alternative and Alternative Three which, if permitted by DOE, would allow quarrying
21 on basalt outcrops that are important religious and cultural sites. Alternative Two would
22 designate most of the Hanford Site for Preservation to protect cultural resources and would be
23 least likely to have cumulative impacts.

24
25 **5.6.2.5 Aesthetic Resources.** The large, undeveloped portions of the Hanford Site and
26 features such as the basalt outcrops, Rattlesnake Mountain, the White Bluffs, and the Columbia
27 River Corridor have aesthetic values that are unique to the region. Industrial development
28 associated with past Hanford operations has altered some viewsheds. Future development of
29 Hanford Site lands could further alter viewsheds and reduce the aesthetic value by increasing
30 airborne particulate, odors, or other pollutants.

31
32 The potential for cumulative impacts to viewsheds would be greatest under the No-
33 Action Alternative, which would allow development of Hanford Site lands on a project-by-project
34 basis. This alternative is more likely to result in the siting and construction of industrial
35 developments in previously undisturbed viewsheds. Alternative Three could also have
36 cumulative impacts to viewsheds by allowing, if permitted by DOE, quarrying on basalt
37 outcrops, the conversion of native plant communities on the Wahluke Slope to crop land and
38 orchards, and development of High-Intensity Recreational facilities adjacent to the Columbia
39 River Corridor. Future industrial development under the Industrial-Exclusive land-use
40 designation, along with proposed and planned actions listed in Table 5-14, would have
41 cumulative effects on viewsheds that would be similar under the alternatives being considered.

42
43 Alternative Three also has the greatest potential for cumulative impacts on visibility
44 associated with air quality. The conversion of much of the Wahluke Slope to agriculture would
45 create a significant new source of fugitive dust from cultivated fields. Industrial development
46 under this alternative as well as all other alternatives being considered could also result in new
47 sources of industrial pollutants, which could further diminish visibility.

48
49 Future development could also increase ambient noise levels, which would detract from
50 the recreational experience associated with the Columbia River Corridor and other natural
51 areas on the Hanford Site. Cumulative increases in noise are most likely occur under the No-
52 Action Alternative, which could allow industrial development along the Columbia River. Mining
53 along the river corridor, which could occur under the No-Action Alternative, could also increase
54 noise impacts. Increases in High-Intensity Recreational land-use activities such as Alternative
55 Three's proposed destination resort and RV camps or the Preferred Alternative's and

1 Alternative Four's proposed Tribal fishing camps, could also increase the noise along the river
2 and distract from the aesthetic experience.
3

4 **5.6.3 Cumulative Socioeconomic Impacts**

5
6 The economy of the area has in the past been strongly influenced by Hanford Site
7 activities. Changes in the Site mission and reductions in Site activities have had negative
8 impacts in the past. Recently, the area economy has become more diversified and less
9 dependent on the Hanford Site. Future development of Hanford Site lands under multiple uses
10 could accelerate the transition to a diversified economy. On the other hand, economic growth
11 associated with future uses of the Hanford Site could cumulatively increase demand for
12 infrastructure and services.
13

14 Alternative Three has the greatest potential to have cumulative impacts, both positive
15 and negative, on socioeconomic conditions. On the positive side, Alternative Three would
16 provide the most opportunities to develop alternate uses of Hanford Site lands, maximizing the
17 economic return. Alternative Three could have negative impacts on socioeconomic conditions
18 by increasing the demand for services, including schools, law enforcement, and health and
19 human services. Alternative Two has the least potential to have cumulative socioeconomic
20 impacts because it would minimize future Hanford Site development.
21

22 As was discussed in Section 5.3.1, future industrial development on Hanford Site lands
23 could place increased demand on infrastructure beyond the City of Richland's capacity. This
24 potentially cumulative impact could occur under the Preferred Alternative and Alternatives
25 Three and Four because they have Industrial land-use designations larger than the City of
26 Richland UGA. However, the impact would be the most under the No-Action Alternative,
27 because no land-use plan would be available to assist government entities in anticipating and
28 addressing increased demand.
29

30 **5.6.4 Cumulative Human Health Risk**

31
32 Risks due to exposure to residual contamination remaining after completion of CERCLA
33 activities would be dependent on the level of access to any particular area where residual
34 contamination remained. New wastes could be imported for disposal as specified in the RODs
35 for the *Waste Management Programmatic Environmental Impact Statement* (DOE/EIS-0200,
36 May 1997). Health risks from the new wastes would be principally to workers and could include
37 physical hazards and latent cancer fatalities from waste management activities over the 20-year
38 period of waste movements analyzed. Collective worker health risk estimates for the potential
39 new wastes are one fatality for Low-Level Mixed Waste, three fatalities for High-Level Waste,
40 and up to four fatalities for Low-Level Waste, depending on whether Hanford is selected as a
41 Low-Level Waste disposal site. Less than one latent cancer fatality is estimated among the
42 offsite population. These proposed waste management activities could greatly increase waste
43 shipments entering or leaving the site.
44

45 Consequently, the cumulative health risk to humans would be expected to be greatest
46 under Alternative Three because it would provide greater access to more areas and would
47 provide more opportunities for development of Hanford Site lands than would the other
48 alternatives. Conversely, Alternative Two would have the least potential for cumulative human
49 health risks, because it would provide the least access to Hanford Site lands.
50

51 Significant occupational risk to workers could occur under some industrial uses, under
52 both the Industrial-Exclusive and Industrial land-use designations. Agriculture is also
53 traditionally a high risk occupation (Table 5-13). Cumulative occupational risk would likely be
54 the greatest under Alternative Three because of the large area designated for Agriculture and
55 the higher level of use associated with the entire Hanford Site. Conversely, occupational risk

1 would be lowest for Alternative Two because industrial risk would be limited to workers in the
2 200 Areas (similar under all alternatives) and Alternative Two designates the smallest area for
3 Industrial development.
4
5

6 **5.7 Other NEPA Considerations**

7
8 NEPA is used by the Executive Branch through Executive Orders to further the
9 administration's goals in several policy areas. NEPA integration requires the presentation of
10 many diverse subject areas to ensure that the Federal decision maker is fully informed.
11

12 **5.7.1 Unavoidable Adverse Impacts**

13
14 The potential unavoidable adverse impacts associated with implementation of future
15 land uses on the Hanford Site are described in the following section. Unavoidable adverse
16 impacts are impacts that would occur after implementation of all feasible mitigation measures.
17 Although these impacts would not occur as a result of adoption of any particular land-use plan,
18 unavoidable adverse impacts would occur as a result of development of undisturbed land for
19 other uses. The greatest potential for unavoidable adverse impacts is associated with more
20 intensive land uses and the areal extent of those uses in each alternative. These impacts
21 would be associated with the degree of disturbance of sensitive habitats and loss of cultural
22 resources.
23

24 Land-use designations with the greatest potential for unavoidable adverse impacts are
25 Agriculture, Industrial, Industrial-Exclusive, and High-Intensity Recreation. Designations with
26 less potential for unavoidable impacts (but that would likely include some unavoidable adverse
27 effects on resources) include Research and Development, Low-Intensity Recreation,
28 Conservation (Mining and Grazing), and Conservation (Mining). Unavoidable adverse impacts
29 would be minimal or nonexistent under the Preservation designation.
30

31 The Hanford Site has an abundance of significant cultural resources and conversion of
32 land from the relatively undisturbed condition could result in the loss of significant resources.
33 These resources are considered irreplaceable. The extent of damage to these resources would
34 depend on the extent of the land area converted to intensive uses and the distribution of the
35 resources relative to the location of the disturbance. Some resource locations are more
36 significant than others, and each location must be assessed individually. Mitigation measures,
37 such as data collection, would be implemented but unavoidable adverse impacts associated
38 with destruction of the actual location of resources would occur as a result of some land-use
39 designations.
40

41 The Hanford Site also represents one of the last remaining large tracts of the shrub-
42 steppe habitat that previously covered extensive areas in eastern Washington State. Intensive
43 use of these lands could result in the loss of significant amounts of this habitat and could
44 potentially lead to listing (as threatened or endangered) species that are dependent upon this
45 habitat. Although lands converted to other uses potentially could revert to the original state, this
46 reversion is unlikely to occur because the land would remain in the developed condition and
47 reversion would require many years.
48

49 Physical impacts on terrestrial resources and sensitive habitats (e.g. aquatic habitat,
50 wetlands, shrub-steppe habitat) would be unavoidable under some land-use designations.
51 Permanent loss of habitat for some species of concern could occur and could result in
52 population declines. Habitat loss within the 200 Areas would likely be unavoidable, but these
53 losses are anticipated to be similar under all alternatives. The magnitude of potential physical

1 impacts across other areas on the Hanford Site depends upon the land-use designations
2 associated with particular alternatives.
3

4 The Agriculture land-use designation has the greatest potential for unavoidable adverse
5 impacts. Destruction of cultural resource sites, both on the land converted to this use (and,
6 potentially, as a result of increased slumping of the White Bluffs if uncontrolled irrigated
7 agriculture occurs on the Wahluke Slope), would be unavoidable under this designation.
8 Shrub-steppe habitat in areas converted to agricultural use would be lost. Depending on the
9 area of land converted to agriculture, mitigation of habitat loss would not be feasible.

10
11 Industrial, Research and Development, and High-Intensity Recreation land-use
12 designations could result in unavoidable adverse impacts to cultural resources and sensitive
13 habitats. The degree of impact would depend on the extent of development. Siting of specific
14 industrial facilities could be modified to minimize impacts. Nevertheless, if large portions of
15 areas designated for Industrial use are ultimately used, cultural and biological resources within
16 the areas would be lost. Similarly, development of High-Intensity Recreational facilities (e.g.,
17 golf courses) or R&D facilities could involve loss of or damage to resources.

18
19 Other potential unavoidable adverse impacts would be associated with grazing of
20 livestock (resulting in damage to habitats that are sensitive to grazing or physical damage of
21 cultural resources), inadvertent or deliberate damage to cultural resources due to increased
22 exposure of resources to humans, and localized damage to resources due to mining activities.

23
24 Implementation of Alternative Three would involve the greatest potential for unavoidable
25 adverse impacts. These impacts would be associated with loss of cultural and biological
26 resources due to conversion of extensive areas on the Wahluke Slope to agriculture and with
27 the area designated for Industrial use, and Research and Development. Alternative Three also
28 includes the greatest extent of land designated for Recreational uses.

29
30 The Preferred Alternative also could potentially lead to unavoidable adverse impacts
31 associated with lands designated for Industrial Use, Research and Development, and
32 Conservation (Mining). Although impacts associated with other land-use designations could
33 potentially be mitigated, Industrial and Research and Development uses would likely lead to
34 unavoidable adverse impacts to some cultural and biological resources.

35
36 Implementation of Alternative Two would have the least potential for unavoidable
37 adverse impacts. This alternative designates virtually the entire Hanford Site for Preservation.
38 Areas designated for other uses occur largely in previously disturbed areas. Unavoidable
39 adverse impacts under this alternative would be minimal and would be associated with
40 Industrial-Exclusive use of the 200 Areas (similar under all alternatives) and with Industrial use
41 in the UGA north of the City of Richland, which is smaller than the area designated for Industrial
42 use under all other alternatives.

43
44 Alternatives One and Four represent intermediate conditions between Alternative Two
45 and the Preferred Alternative. Potential unavoidable adverse impacts under the No-Action
46 Alternative could involve development of any portion of the Hanford Site in the future, with the
47 exception that this alternative assumes that management on the Wahluke Slope and ALE
48 Reserve would continue to be similar to current management.

49 50 **5.7.2 Irreversible and Irretrievable Commitments of Resources**

51
52 The identification of irreversible and irretrievable (I&I) commitments of resources
53 associated with actions proposed by Federal agencies is required by NEPA. On land-use
54 projects, I&I commitments are related to the use of nonrenewable resources and the effects
55 that consumption of those resources could have on future generations. For example,

1 irreversible effects occur as a result of use or destruction of a resource (i.e., energy and
2 minerals) that cannot be replaced within a reasonable time, while irretrievable resource
3 commitments involve the loss in value of an affected resource that cannot be restored (i.e.,
4 extinction of a species or disturbance of a cultural site).
5

6 The Final HCP EIS does not I&I commit resources to any specific project of the Hanford |
7 Site, but does I&I commit natural resources to the land-use designations as allocated by |
8 Table 3-1. After incorporating by reference the previous 1975 ERDA 1538 irreversible and |
9 irretrievable (I&I) commitments and other documented commitments into this EIS (see Section |
10 1.3), future individual project land-use requirements would be I&I committed through the |
11 appropriate NEPA and CERCLA/RCRA/NEPA integrated processes, as described in Chapter 6. |
12 Table 3-3 summarizes the commitment of Hanford Site lands, by land-use designation, for each |
13 alternative.

14 15 **5.7.3 Conflicts with Land-Use Plans of Other Federal, Regional, State, Local, and Tribal** 16 **Agencies**

17
18 The Draft HRA-EIS CLUP (DOE 1996) identified one vision for the future use of Hanford |
19 Site lands. Numerous comments were received by DOE from other agencies, Tribal |
20 governments, and stakeholders indicating that a land-use plan for the Hanford Site needed to |
21 be developed. These comments indicated that alternative land-use plans needed to be |
22 analyzed and compared to the plan presented in the Draft HRA-EIS CLUP, and that DOE |
23 needed to identify a Preferred Alternative for future land use at the Hanford Site. As a result of |
24 these comments and concerns regarding different visions for the future of Hanford Site lands, |
25 DOE initiated a process of coordination and consultation with other Federal, state, and local |
26 government agencies, and Tribal governments to develop and analyze potential impacts |
27 associated with alternative land-use scenarios for the Hanford Site. The DOE revised the |
28 August 1996 Draft HRA-EIS to reflect these concerns and is presenting the impact analysis in |
29 this Final HCP EIS.

30
31 Existing plans of other Federal, state, and local agencies, and Tribes have been |
32 incorporated as alternatives in the Final HCP EIS if those agencies or Tribes elected to provide |
33 DOE with a land-use map depicting a vision for the future of Hanford Site lands. The DOE |
34 cannot speculate with regard to land-use patterns that might be preferred by agencies or Tribes |
35 that did not provide a specific vision for the future of land use at the Hanford Site. Therefore, |
36 DOE knows of no existing land-use plans in conflict with the alternatives presented in this Final |
37 HCP EIS.

38
39 The DOE recognizes the interest of the BoR and the BLM in lands withdrawn from them |
40 at the Hanford Site, and acknowledges the U.S. Atomic Energy Commission's agreement to |
41 return lands no longer needed for safeguards and security purposes in the Wahluke Slope to |
42 the BoR for development as part of the Columbia Basin Project. The DOE also recognizes, as |
43 a co-preparing agency, the alternative selected in the ROD for the Hanford Reach EIS (NPS |
44 1994). This alternative would designate the land within the Wahluke Slope as a NWR. The |
45 DOE and BLM have discussed consolidation of BLM lands within a specific area of the Hanford |
46 Site (Figure 4-3), or exchanging Hanford Public Domain lands for lands elsewhere with natural |
47 resources values. The BLM may consider selling land to private entities to allow Industrial, |
48 Research and Development, or High-Intensity Recreation uses to occur on BLM's scattered |
49 tracts of land if the economic return would fund appropriate environmental mitigation elsewhere. |
50 Public comment such as the anti-grazing response received on this EIS will help determine the |
51 path forward.

52
53 The BLM completes approximately 65 land exchanges per year, acquiring nearly |
54 60,703 ha (150,000 ac) valued over \$60,000,000. Current law restricts exchanges to lands |
55 located within the same state. In general, the lands must be of equal value, although limited |

1 cash equalization adjustments are allowed. Certain low value exchanges may proceed on the
2 basis of "approximately equal" value.
3

4 The exchange of land is authorized under the *Federal Land Policy and Management Act*
5 *of 1976*, (FLPMA), as amended, and the *Federal Land Exchange Facilitation Act of 1988*
6 (FLEFA). The BLM's final rulemaking implementing FLEFA was published jointly with the
7 U.S. Forest Service in 1993. A final Land Exchange Handbook was completed in 1997
8 replacing a draft that was in use for over two years.
9

10 Land exchange has been identified as a high priority within the DOI as well as BLM.
11 Exchanges provide the opportunity for BLM to acquire lands with high recreational, wildlife
12 habitat, scenic, and cultural resource values. They are also used to consolidate BLM lands into
13 more manageable units and to meet community expansion needs.
14

15 Recent accomplishments in this program include the following:
16

- 17 • **Lake Tahoe, Zephyr Cove, Nevada** -- The Federal government acquired 14 ha
18 (35 ac) along Lake Tahoe. The property has nearly 1.6 km (1 mi) of sandy beach,
19 spectacular scenic views, and an opportunity to protect sensitive plant and animal
20 species. The BLM traded approximately 546 ha (1,350 ac) of lands in the Las
21 Vegas Valley for the property. The lands acquired will be managed by the U.S.
22 Forest Service.
23
- 24 • **Lake Fork of the Gunnison River, Colorado** -- The BLM acquired 1,376 ha
25 (3,400 ac) of Smock Ranch (formerly Gateview Ranch) along the Lake Fork of the
26 Gunnison River. The BLM plans to acquire approximately 809 ha (2,000 ac) of the
27 adjacent Thomas Ranch in a second phase. The exchange provides valuable
28 fisheries and recreational resources, and reduces the BLM's management costs by
29 placing 33 small isolated parcels into private ownership.
30
- 31 • **Santa Ana Pueblo, New Mexico** -- Approximately 6,070 ha (15,000 ac) of Federal
32 and state lands were transferred to the Santa Ana Pueblo, resolving a 20-year
33 commitment to eliminate the "checkerboard" land ownership pattern within the
34 Pueblo's boundary. The BLM will receive state lands located in wilderness study
35 areas and other special management areas throughout the state.
36
- 37 • **Clearwater - Phase II, Washington** -- The BLM acquired 364 ha (900 ac) of land
38 including 3.2 km (2 mi) of river frontage adjacent to the Grande Ronde National Wild
39 and Scenic River. The lands have important values for fish and wildlife as well as
40 high recreational value for fishing, hunting, white water boating, hiking, and
41 sightseeing.
42

43 **5.7.4 Relationship Between Near-Term Use and Long-Term Productivity** 44 **of the Environment** 45

46 For the purposes of this Final HCP EIS, near-term use is defined to encompass the
47 50-year planning period associated with this EIS. Long-term productivity is defined to
48 encompass the period following this planning window.
49

50 The DOE anticipates that considerable activity related to ongoing remedial actions will
51 occur at the Hanford Site for the near-term. This activity would likely influence allowable land
52 uses in the near-term. New near-term uses would be consistent with land-use designations
53 adopted in the ROD for this Final HCP EIS, and remedial activities would be anticipated to
54 support those uses and designations.

1 Although the land-use alternatives analyzed in this Final HCP EIS represent varied
2 viewpoints of the best use of Hanford Site lands within the near-term, the objective of these
3 plans is establishment of a framework for balancing overlapping long-term needs to meet the
4 requirements of DOE missions, community development, recreational opportunities, and
5 resource preservation. Long-term productivity can be enhanced through this process because
6 conflicting viewpoints regarding the best use of Hanford Site land can be objectively analyzed,
7 and the uses to satisfy the various real and perceived needs can be incorporated into long-term
8 planning. Through this planning process, long-term productivity of Hanford Site lands can be
9 enhanced by establishing areas that would be devoted in the short- and long-term for uses
10 ranging from intensive development to preservation.
11

6.0 Implementation of the Comprehensive Land-Use Plan

This chapter provides an overview of the policies and implementing procedures that would be used by DOE, the cooperating agencies and the consulting Tribal governments to implement the Hanford Comprehensive Land-Use Plan (CLUP) following the Record of Decision (ROD) for the *Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (HCP EIS).

The DOE is expected to use this land-use plan in its decision-making process to establish what is the "highest and best use"¹ of the land (41 CFR 101-47, "Federal Property Management Regulations"). The final selection of a land-use map, land-use policies and implementing procedures, would create the working CLUP when they are adopted through the ROD for this EIS.

Once adopted, the CLUP would provide the framework within which future use of the Hanford Site's lands and resources occurs. In developing the CLUP DOE will have considered the visions, goals, and objectives articulated by participants in the land-use planning process. This framework consists of four basic elements:

1. A final ***Hanford CLUP Land-Use Map***, depicting land uses for the Site (see Chapter 3). The ROD for this EIS would select one of the alternative land-use maps presented in Chapter 3 or would select a land-use map such as the new Preferred Alternative that combines features of several alternatives.
2. ***Hanford CLUP Land-Use Definitions***, describing the purpose, intent, and principal use(s) of each of the land-use designations on the adopted CLUP map (see Chapter 3, Table 3-1, and Section 6.1 below).
3. ***Hanford CLUP Policies***, directing land-use actions. These policies will help to ensure that individual actions of successive managers collectively advance the adopted CLUP map, goals, and objectives over time (see policies in Section 6.3).
4. ***Hanford CLUP Implementing Procedures***, including:
 - Administrative procedures for reviewing and approving Use Requests for consistency with the CLUP
 - A Site Planning Advisory Board (SPAB) consisting of representatives from DOE, the cooperating agencies and the affected Tribal governments
 - Actions which, after plan adoption, shall be undertaken to align and coordinate existing and new "area" and "resource" management plans for the Site (e.g., The Comprehensive Conservation Plan for the Fitzner/Eberhardt Arid Lands Ecology Reserve [ALE Reserve]; fire; cultural and historical resources; and species management), with the policies and designations of the CLUP.

¹ Section 101-47.4909 of the *Federal Property Management Regulations* defines the "highest and best use" as that use to which a property can be put that produces the highest monetary return from the property, promotes its maximum value, or serves a public or institutional purpose. The "highest and best use" determination must be based upon the property's economic potential, qualitative values inherent in the property, and utilization factors affecting land use such as zoning, physical characteristics, other private and public uses in the vicinity, neighboring improvements, utility services, access, roads, location, and environmental and historical considerations.

1 For all proposals and projects, the above procedures and actions would be integrated
 2 with existing DOE land-use review procedures (e.g., biological, cultural, and the *National*
 3 *Environmental Policy Act of 1969* [NEPA]), while DOE maintains control of the land. The DOE
 4 has the final determination and approval of all land-use decisions taking place on the Hanford
 5 Site land under DOE authority.
 6
 7

8 **6.1 Definitions and Descriptions of Land-Use Map Designations**

9
 10 The land-use designations of each land-use map depict the categories of land use that
 11 would occur within specific geographic locations of the Site. Ideally, the designated use is
 12 suitable, based on a broad range of factors including natural and biological resources; existing
 13 uses; infrastructure; proximity to other development; economic objectives; and historical,
 14 prehistorical, and aesthetic resources and values.
 15

16 The definitions of the various land-use designations are provided in Table 6-1. These
 17 land-use designations and their definitions were developed by the cooperating agencies and
 18 are discussed in greater detail in Chapter 3 of this Final HCP EIS.
 19
 20

21 **Table 6-1. Hanford Site Land-Use Designations.**

Land-Use Designation	Definition
Industrial-Exclusive	An area suitable and desirable for treatment, storage, and disposal of hazardous, dangerous, radioactive, and nonradioactive wastes. Includes related activities consistent with Industrial-Exclusive uses.
Industrial	An area suitable and desirable for activities, such as reactor operations, rail, barge transport facilities, mining, manufacturing, food processing, assembly, warehouse, and distribution operations. Includes related activities consistent with Industrial uses.
Agricultural	An area designated for the tilling of soil, raising of crops and livestock, and horticulture for commercial purposes along with all those activities normally and routinely involved in horticulture and the production of crops and livestock. Includes related activities consistent with Agricultural uses.
Research and Development	An area designated for conducting basic or applied research that requires the use of a large-scale or isolated facility or smaller scale time-limited research conducted in the field or in facilities that consume limited resources. Includes scientific, engineering, technology development, technology transfer, and technology deployment activities to meet regional and national needs. Includes related activities consistent with Research and Development.
High-Intensity Recreation	An area allocated for high-intensity, visitor-serving activities and facilities (commercial and governmental), such as golf courses, recreational vehicle parks, boat launching facilities, Tribal fishing facilities, destination resorts, cultural centers, and museums. Includes related activities consistent with High-Intensity Recreation.
Low-Intensity Recreation	An area allocated for low-intensity, visitor-serving activities and facilities, such as improved recreational trails, primitive boat launching facilities, and permitted campgrounds. Includes related activities consistent with Low-Intensity Recreation.
Conservation (Mining and Grazing)	An area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining (e.g., quarrying for sand, gravel, basalt, and topsoil for governmental purposes only) and grazing could occur as a special use (i.e., a permit would be required) within appropriate areas. Limited public access would be consistent with resource conservation. Includes activities related to Conservation (Mining and Grazing), consistent with the protection of archeological, cultural, ecological, and natural resources.
Conservation (Mining)	An area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining (e.g., quarrying for sand, gravel, basalt, and topsoil for governmental purposes only) could occur as a special use (i.e., a permit would be required) within appropriate areas. Limited public access would be consistent with resource conservation. Includes activities related to Conservation (Mining), consistent with the protection of archeological, cultural, ecological, and natural resources.
Preservation	An area managed for the preservation of archeological, cultural, ecological, and natural resources. No new consumptive uses (i.e., mining or extraction of non-renewable resources) would be allowed within this area. Limited public access would be consistent with resource preservation. Includes activities related to Preservation uses.

1
2 **6.2 Definitions for Terms Relating to Plan Implementation**
3

4 The following three definitions – Allowable Use, Special Use, and Amendments – relate
5 the land-use policies to the land-use maps:
6

- 7
- 8 • **Allowable Use** – Any reservation of land for a physical development or land-use
9 activity that is consistent with the land-use designation and policies of the land-use
10 map and CLUP, or a specifically identified part of an approved area management
11 plan (AMP), except for “Amendments” or uses that are identified as “Special Use.”
12 Any new remediation project or support activity that is categorically excluded under
13 DOE’s NEPA regulations (10 CFR 1021) is an allowable use, except projects
14 proposed in the Preservation designation. |

 - 15 • **Special Use** – Activities requiring further review and approval prior to being allowed.
16 The following are special uses.
17
 - 18 1. Any physical development or land-use activity in the Preservation designation |
 - 19
 - 20 2. Any physical development or land-use activity in the Conservation designation |
21 that is not categorically excluded under DOE’s NEPA regulations (10 CFR 1021) |
 - 22
 - 23 3. AMPs outside of the 200, 300, and 400 Areas |
 - 24
 - 25 4. Any proposed new development that is inconsistent with the land-use
26 designation of the adopted local counties’ or cities’ comprehensive plans for the
27 Hanford Site
 - 28
 - 29 5. Mining or grazing activities within areas designated for Conservation
 - 30
 - 31 6. Any proposed new project that is located within an area that has a deed or
32 covenant restriction as a result of the remediation process (e.g., institutional |
33 controls) |
 - 34
 - 35 7. Additions to or enlargements of pre-existing, nonconforming uses
 - 36
 - 37 8. Any proposed new project that establishes an exclusive use zone (EUZ) over
38 lands not currently under an EUZ (see Section 4.11.4). |
 - 39

 - 40 • **Amendments** – Amendments are required for the following:
41
 - 42 1. Any change to the map land-use designation of an area
 - 43
 - 44 2. Any change to CLUP policy
 - 45
 - 46 3. Any change in the use of land or an existing facility to a use that is inconsistent
47 with the land-use designation.
 - 48

49 Additionally, definitions are used to define the terms of the land-use policies. These
50 definitions include the following:
51

- 52 • **Area management plans (AMPs)** – Management plans for specific geographic
53 areas, which may include specific resource management plans, mitigation
54 strategies, and various uses and facilities. An AMP shall be consistent with the

1 CLUP's land-use designations and policies.

- 2
- 3 • **Use Request** -- A Use Request is a proposal to use land or a facility for an activity
- 4 different from what is currently occurring. Use Requests can include site
- 5 preparations, leasing, granting right-of-ways, or any other land-use related activities.
- 6
- 7 • **Policy** -- Policies are statements of intent which direct decisions toward the
- 8 accomplishment of adopted goals and objectives. Policies are applied on a
- 9 continuous basis and applied consistently over time.
- 10
- 11 • **Pre-existing, Nonconforming Use** -- Any existing lawfully established use that is
- 12 neither allowed nor conditionally permitted within a land-use designation, but exists
- 13 therein, having been established prior to the CLUP land-use designation.
- 14
- 15 • **Resource management plan (RMP)** -- A RMP contains adopted management
- 16 standards and strategies for a specific resource. Generally, resources subject to
- 17 RMPs are not confined to geographically discrete areas and they are not static
- 18 (i.e., their characteristics and conditions often vary in time and/or location across the
- 19 Site). Examples of resources which have RMPs are biological resources (Draft
- 20 *Biological Resources Management Plan* [BRMaP] [DOE-RL 1996c]), cultural
- 21 resources (Draft *Cultural Resources Management Plan* [CRMP] [DOE-RL 1999]),
- 22 and the *Bald Eagle Management Plan* (DOE-RL 1994b). The provisions of each
- 23 RMP apply wherever its subject resource occurs on the Site, except for areas
- 24 specifically exempted within the RMP itself.

25

26 Several RMPs may apply within an AMP. A single RMP may extend across several

27 AMPs. Where an RMP exists within an AMP, the provisions of both must be

28 integrated toward achieving their common objectives, consistent with land-use

29 designations within which they occur.

- 30
- 31 • **RL Manager** -- The RL Manager is the Manager of DOE's Richland Operations
- 32 Office (RL).
- 33
- 34 • **RL Site Management Board (SMB)** -- The SMB is chaired by the Site Deputy
- 35 Manager and comprises selected members of RL senior management staff.
- 36
- 37 • **Real Estate Officer (REO)** -- The REO, from the RL Site Services Division (SSD), is
- 38 the single point of contact for reviewing, processing, and coordinating land-use
- 39 activities on the Hanford Site.
- 40
- 41 • **Shall** -- For the purpose of Chapter 6 of this EIS, "shall" refers to activities that
- 42 would be mandatory if adopted by the ROD.
- 43
- 44 • **Should** -- For the purpose of Chapter 6 of this EIS, "should" refers to activities that
- 45 would be discretionary if adopted by the ROD.
- 46
- 47 • **Site Planning Advisory Board (SPAB)** -- The SPAB is an advisory board to land-
- 48 use matters on the Hanford Site. The SPAB consists of representatives from
- 49 cooperating agencies with land-use authority, and affected Tribal governments. The
- 50 SPAB reviews Use Requests that are not "allowable uses" and makes
- 51 recommendations to DOE.
- 52

1 **6.3 Hanford CLUP Policies**
2

3 The Hanford CLUP policies connect all the CLUP elements. It is expected that the ROD
4 for this EIS would set forth the following policies:
5

- 6 • Establish land-use mitigation procedures
7
- 8 • Establish hierarchies, priorities, and standards relating to land use, resource use,
9 and values
10
- 11 • Integrate competing land and resource goals and objectives
12
- 13 • Provide reference points for addressing unanticipated circumstances and making
14 actual Amendments to the CLUP when necessary
15
- 16 • Identify which RMPs or AMPs shall be considered for development or revision as
17 part of the CLUP implementation.
18

19 Land-use and resource-related decisions, actions, and programs should neither conflict
20 with, nor be inconsistent with the adopted CLUP map and policies. Actions related to policies
21 should be feasible and practical, and policies should be consistently applied on a continuous
22 basis.
23

24 The Hanford CLUP policies are described below. They are a synthesis of stated values
25 and objectives from DOE, Future Site Uses Working Group, Hanford Advisory Board, August
26 1996 Draft HRA-EIS, April 1999 Revised Draft HRA-EIS written comments, public hearings and
27 public meetings, cooperating agencies, consulting Tribal governments, and those associated
28 with municipal and county land-use planning principles.
29

30 **6.3.1 Overall Policy**
31

32 The CLUP policy would accomplish the following for the Hanford Site:
33

- 34 1. Protect the Columbia River and associated natural and cultural resources and water
35 quality.
36
- 37 2. Wherever possible, locate new development, including cleanup and remediation-
38 related projects, in previously disturbed areas.
39
- 40 3. Protect and preserve the natural and cultural resources of the Site for the
41 enjoyment, education, study, and use of future generations.
42
- 43 4. Honor treaties with American Indian Tribes as they relate to land uses and resource
44 uses.
45
- 46 5. Reduce exclusive use zone (EUZ) areas to maximize the amount of land available
47 for alternate uses while still protecting the public from inherently hazardous
48 operations (see Section 4.11.4).
49
- 50 6. Allow access for other uses (e.g., recreation) outside of active waste management
51 areas, consistent with the land-use designation.
52
- 53 7. Ensure that a public involvement process is used for amending the CLUP and land-
54 use designations to respond to changing conditions.
55

1 8. As feasible and practical, remove pre-existing, nonconforming uses.

2
3 9. Facilitate cleanup and Waste Management.

4
5 **6.3.2 Protection of Environmental Resources**

6
7 The CLUP policy would accomplish the following for the Site:

- 8
9 1. Implement DOE's *Land- and Facility-Use Policy* (DOE P 430.1), which is to protect
10 and sustain native species and their habitats on the Site. The Conservation and
11 Preservation land-use designations are the primary land-use controls to accomplish
12 this policy. Within the Conservation and Preservation designations, land uses shall
13 be consistent with the purpose of the designation and significant impacts shall be
14 mitigated. Implementation mechanisms such as the BRMaP (DOE-RL 1996c), the
15 Draft *Hanford Site Biological Resources Mitigation Strategy Plan* (BRMiS) (DOE-RL
16 1996), the *Hanford Site Ground-Water Protection Management Plan* (DOE-RL
17 1995a) and cultural management plans augment these designations for
18 development review and approval Site-wide. Developments for public access and
19 recreation should be according to adopted AMPs depicting management of use, and
20 siting of support facilities.
- 21
22 2. Within land-use designations other than Conservation and Preservation, mitigate
23 significant unavoidable (residual) impacts at locations by enhancing habitats within
24 the Conservation or Preservation designations. To accomplish this, undertake the
25 following actions:
- 26
27 a. Modify the BRMaP (DOE-RL 1996c) and BRMiS (DOE-RL 1996) to be consistent
28 with this policy and with implementing procedures.
- 29
30 b. Review habitat management plans to redirect their mitigation actions and
31 strategies, where necessary and possible, to the established Conservation and
32 Preservation areas.
- 33
34 c. Consider provisions for the protection of "vulnerable aggregations," as defined by
35 the Washington Department of Fish and Wildlife, for non-game species wherever
36 they occur on the Site.
- 37
38 3. Require that projects have reasonable setbacks from the Preservation and
39 Conservation features of importance.
- 40
41 a. Within all land-use designations, require that land not be cleared until a specific
42 project has been approved consistent with DOE's NEPA regulations (10 CFR
43 1021).

44
45 **6.3.3 Protection of Cultural Resources**

46
47 The CLUP policy would accomplish the following for the Site:

- 48
49 1. Implement DOE's *Land- and Facility-Use Policy* (DOE P 430.1), which is to protect
50 and sustain cultural resources on the Site. The Conservation and Preservation land-
51 use designations are the primary land-use controls to accomplish this policy. The
52 CRMP addresses those actions where land-use controls are not the appropriate
53 mitigation (i.e., if a cultural resource is found in an Industrial designation, provisions
54 of the CRMP would be applied to mitigate impacts to the resource). Within the
55 Conservation and Preservation designations, land uses shall be consistent with the

1 purpose of the designation and significant impacts mitigated. Implementation
2 mechanisms such as the CRMP (DOE-RL 1999), and habitat management plans
3 augment these designations for Site-wide reviewing and approving proposed
4 development. Developments for public access and recreation should be according
5 to adopted AMPs depicting management of use, and siting of support facilities.
6

- 7 2. Proposed developments within all areas should be reviewed consistent with the
8 BRMaP (DOE-RL 1996c) and the CRMP (DOE-RL 1999), and reflected in the
9 applicable AMP.

10 **6.3.4 Siting New Development**

11 The CLUP policy would accomplish the following for the Site:
12

- 13 1. Locate and approve new developments in areas consistent with the adopted Hanford
14 CLUP.
15
16 2. Locate proposed projects, as feasible and practical, in those areas of the Hanford
17 Site where the adopted CLUP and the local cities' and counties' land-use maps are
18 consistent.
19
20 3. Within all land-use designations, previously disturbed areas (as identified by the
21 BRMaP and CRMP) should be developed first, followed by the acreage with the
22 least sensitive biological and cultural resources. Within the Hanford Site's plan of
23 any proposed new development, the acreage with the most sensitive biological and
24 cultural resources should be worked into natural open space for landscaping,
25 buffers, natural drainage areas, etc.
26
27 4. Focus on using existing infrastructure and developed areas for new projects within a
28 land-use designation.
29
30 a. Locate new development in close proximity to existing infrastructure unless a
31 project requires an isolated site away from incompatible uses.
32
33 b. Concentrate development on or adjacent to existing infrastructure. Where
34 extensions of infrastructure are necessary, minimize the extension of
35 infrastructure into undeveloped areas.
36
37 c. Site, plan, and design development to avoid significant impacts on resources.
38 Mitigate unavoidable impacts through design to minimize impacts and mitigation
39 costs associated with biological, cultural, air and groundwater resources.
40
41

42 **6.3.5 Utility and Transportation Corridors**

43 The CLUP policy would accomplish the following for the Site:
44

- 45 1. With to-be-identified exception(s), existing utility and transportation corridor right-of-
46 ways are the preferred routes for expanded capacity and new infrastructure.
47
48 2. Existing utility corridors that are in actual service, clearly delineated, and of defined
49 width, are not considered "nonconforming" uses in any land-use designation.
50
51 3. Utility corridors and systems without the characteristics of number 2 (above) are
52 considered to be nonconforming uses and shall be identified in the applicable RMP
53 or AMP.
54
55

- 1 4 Avoid the establishment of new utility corridors within the Conservation and
2 Preservation designations unless the use of an existing corridor(s) is infeasible or
3 impractical.
- 4
- 5 5. Avoid the location of new above-ground utility corridors and systems in the
6 immediate viewshed of an American Indian sacred site. Prioritize for removal, as
7 funding is available, existing nonconforming utility corridors and systems in such
8 areas.
- 9

10 **6.3.6 Economic Development**

11 CLUP policy would promote the following for the Site:

- 12
- 13
- 14 1. Multiple land uses for both the private and public sector.
- 15
- 16 2. Protection and maintenance of existing functional infrastructure and utilities for use
17 in economic development and Site transition.
- 18
- 19 3. Future Federal missions and programs, consistent with the provisions of the CLUP.
- 20
- 21 4. Protection of natural, historic, and cultural resources to assure continued biodiversity
22 and cultural values as essential elements of a recreation and tourism economy.
- 23
- 24 5. Reduction or elimination of existing conditions which are impediments to the
25 realization of the land-use designations (e.g., scattered withdrawn Public Domain
26 land, contamination, and nonconforming and abandoned developments).
- 27
- 28

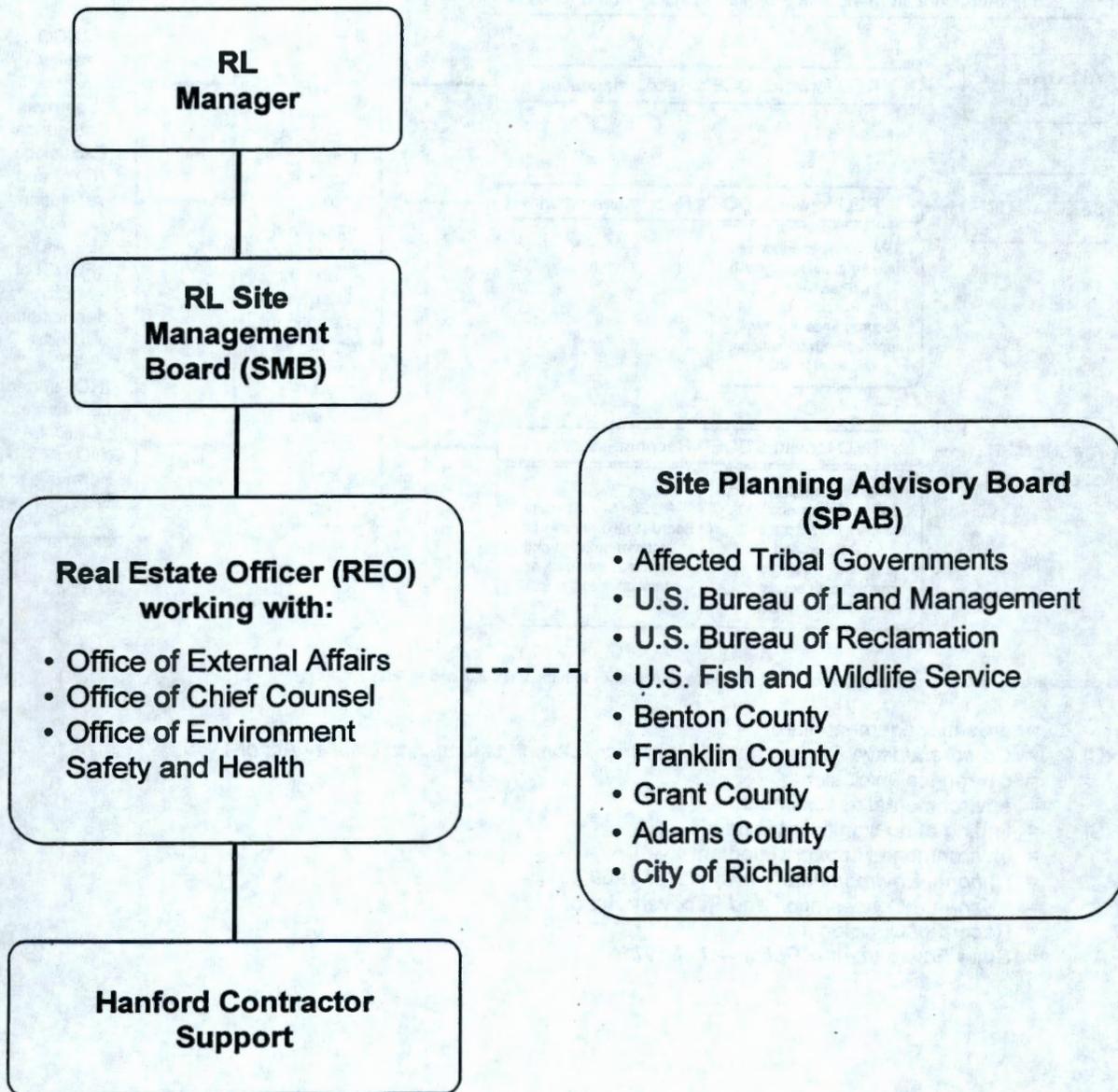
29 **6.4 Organizational Structure and Procedure for Review and Approval of** 30 **Use Requests**

31
32 The existing organizational structure within RL would implement the Hanford CLUP,
33 augmented with a SPAB consisting of representatives from the cooperating agencies and
34 affected Tribal governments. The organizational structure for implementation of the Hanford
35 CLUP is shown in Figure 6-1.

36
37 The REO receives notice (e.g., NEPA checklist, SEPA checklist, CERCLA RI/FS review
38 request, CERCLA review request, RCRA permit request, etc.) from a proposed project or
39 activity and initiates, with the NEPA Compliance Officer (NCO), a coordinated project review
40 (Figure 6-2). As an initial step in the review process, the REO determines whether the project
41 is an "Allowable Use," "Special Use," or "Amendment" to the CLUP. For projects that require
42 Special Use Permits or Plan Amendments, the REO obtains comments and recommendations
43 from the SPAB on the suitability of the proposed "Use" with respect to the existing CLUP map,
44 land-use policies and implementing procedures. For CLUP Amendments, review includes a
45 final RL Site Management Board (SMB) affirmation, or the SMB can refer a proposed Plan
46 Amendment back to the REO for further review. Figure 6-2 depicts the route of review for
47 proposed projects.

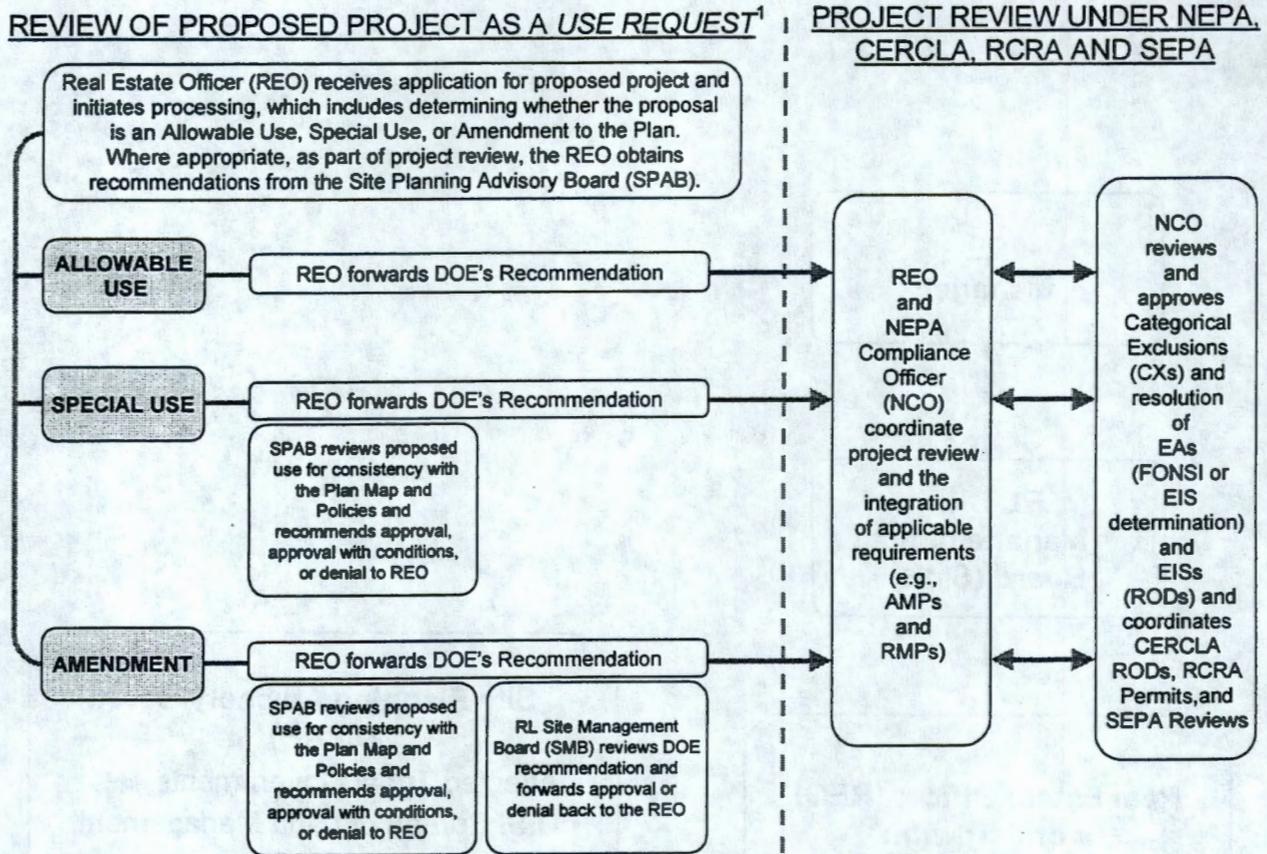
48

1 **Figure 6-1. Organizational Structure for CLUP**
3 **Implementation.**
4



1
2
3
4

Figure 6-2. Review Process for Use Requests.



¹The proposed land or facility use, and location are reviewed for consistency with the Plan Map and Policies.

- 5 AMP = area management plan
- 6 CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
- 7 CX = categorical exclusion
- 8 EA = environmental assessment
- 9 FONSI = finding of no significant impact
- 10 EIS = environmental impact statement
- 11 NEPA = *National Environmental Policy Act of 1969*
- 12 RCRA = *Resource Conservation and Recovery Act of 1976*
- 13 ROD = Record of Decision
- 14 SEPA = *State Environmental Policy Act of 1971*
- 15
- 16

1 **6.4.1 Relationship Between the Site Planning Advisory Board and Real Estate Officer**

2
3 The SPAB has been recommended by the cooperating agencies and consulting Tribal
4 governments as an essential function, and by DOE as a desirable function, for the successful
5 implementation of the CLUP. The SPAB would directly interface with the REO to advise DOE
6 on land use and resource management issues. The SPAB would consist of representatives
7 from the cooperating agencies with land-use authority, and affected Tribal governments. |

8
9 The SPAB would support the REO by reviewing and providing advice for "area" and
10 "resource" management plans, providing policy advice to RL in areas involving coordination of
11 land and resource management, and advising during consideration of nonconforming proposals
12 within the boundaries of the Hanford Site. The SPAB advice shall be provided in a timely
13 manner to support the decision process.

14
15
16 **6.5 Use Requests for Non-Federal Projects**

17
18 Proponents and entities of non-Federal projects shall follow the approval process for Use
19 Requests onsite (Section 6.4). The county, city or private entity would be invited to cooperate
20 early in the Use Request and in the NEPA review process (Figure 6-2). Use Requests for
21 non-Federal projects involving new construction shall be required to comply with applicable
22 local county and/or city review and permitting requirements such as compliance with the
23 Uniform Building Code (UBC), health district requirements, shoreline permits, and local air
24 authority standards.

25
26
27 **6.6 Plan Implementation Requirements**

28
29 After the HCP EIS ROD is approved, the actions presented in this section would be |
30 undertaken to ensure that the plan is implemented. The objectives of these actions are as
31 follows:

- 32
33
- 34 • To streamline and integrate procedures for project review, including ensuring
35 project consistency with the plan, pre-planning for large areas, siting new
36 developments, providing and using infrastructure and utilities, managing resources,
37 notifying the public, and conducting environmental review.
 - 38 • To make decisions on the use of lands and resources on the Site within the frame-
39 work of existing DOE legal and administrative procedures, with an implementation
40 process that parallels, and efficiently coordinates with local land-use regulatory
41 processes, and provides similar accountability and tracking.
 - 42 • To make adjustments in existing DOE administrative structures as necessary to
43 efficiently implement the CLUP.
44

45
46 Achieving these objectives is essential to accomplishing DOE missions and working with
47 Federal agencies, Tribes, and local cities and counties to jointly accomplish planning goals,
48 economic transition, institutional controls, long-term Site stewardship, and multiple uses of the |
49 Site.

50
51 **6.6.1 DOE Equivalent to a Municipal or County Planning Approach**

52
53 Given the mutual objectives of RL and local governments to coordinate on privatization
54 and transition, the management of uses of real estate at the Hanford Site would be done with

1 procedures that are similar to, or compatible with, the administration of land use in the adjacent
 2 municipality or counties. Currently, there are similarities which are amenable to closer
 3 alignment. Table 6-2 shows the similarities between geographic segmentation (e.g., a city in
 4 the county is similar to an area on the Hanford Site). Table 6-3 shows the similarities between
 5 local land-use regulatory procedures and implementation processes on the Hanford Site which,
 6 if aligned and coordinated, would improve management of resources.
 7
 8

9 **Table 6-2. Administration Parallels of RL and Local Jurisdictions.**

Municipal and County-Land Use	≈	DOE Equivalent
Region	≈	Region
County	≈	Hanford Site
City	≈	Area (i.e., 100, 200, 300, and 400)
Neighborhood or Industrial Park	≈	Complex (e.g., ORP)
Site, Lot, and Parcel	≈	Site, Lot, and Parcel
Facility, Utility, and Infrastructure	≈	Facility, Utility, and Infrastructure

19 **Table 6-3. Example of Local Government Processes and RL Counterparts.**

Existing Municipal or County Process	≈	DOE Counterpart
<u>Administrator: Planning Department Director</u> <ul style="list-style-type: none"> • Reviews for consistency with Comprehensive Plan • Coordinates land-use review (e.g., Planning Commission, Board of Adjustment, and Board of County Commissioners) • Administrative/discretionary approval • Initiates <i>State Environmental Policy Act</i> (SEPA) <u>Administrator: Planning Department Director</u> <ul style="list-style-type: none"> • Administers SEPA 	≈	<u>Administrator: Real Estate Officer (REO)</u> <ul style="list-style-type: none"> • Reviews for consistency with CLUP • Coordinates review of Use Requests for real estate (e.g., Site Planning Advisory Board, Site Management Board, and Site Manager) • Not applicable • Initiates NEPA <u>NEPA Compliance Officer (NCO)</u> <ul style="list-style-type: none"> • Administers NEPA
<u>Comprehensive Plan</u> <ul style="list-style-type: none"> • Map • Policies 	≈	<u>CLUP</u> <ul style="list-style-type: none"> • Map • Policies
<u>Regulatory Review</u> <ul style="list-style-type: none"> • Protocols for coordination of Department and agency review 	≈	<u>CLUP RL Implementing Procedures</u> <ul style="list-style-type: none"> • Protocols for coordination of program and agency review
<u>Official Controls</u> <ul style="list-style-type: none"> • Zoning ordinances • Subdivision ordinances • Critical Resources Protection Ordinances • Shoreline management plan • SEPA • Uniform Building Codes • Approval of building permits • Occupancy permits by Building Department • Other controls 	≈	<u>Implementation Controls</u> <ul style="list-style-type: none"> • Design standards • Location and development requirements • Resource management plans • Area management plans • NEPA • Uniform Building Codes • Approval of Use Requests • Occupancy permit by Fire Marshal • Other controls

6.6.2 CLUP Implementation Procedures and Implementation Controls

The CLUP implementation procedures and implementation controls should be made consistent and integrated with the CLUP, so that project activities are consistent with and carry out the CLUP over time. This would be instituted through a RL Implementing Directive for the CLUP, which would provide the mandatory requirements and procedures for RL and its contractors to follow. Integrated implementation procedures would be accomplished within 24 months of the issuance of the HCP EIS ROD, funding permitting, under the coordination of the RL Assistant Manager responsible for the Site Services Division.

Table 6-4 shows the implementing controls (RMPs and AMPs) required for implementation of the CLUP. These controls are tools to ensure that land-use actions are consistent with the CLUP. Prior to the adoption of the controls, each RMP and AMP would be reviewed for consistency and alignment with the CLUP, in accordance with the list of tasks that follows Table 6-4. Task One through Task Seven would be performed sequentially. Completion of these tasks would integrate the various RMPs, AMPs, and project-review activities currently in use on the Site with the CLUP implementation procedures.

Table 6-4. Current Status of CLUP Implementing Controls (RMPs and AMPs).

Resource Management Plans (RMPs)	To Be Prepared	Current Draft	Current Final	Revision Planned
Hanford Cultural Resources Management Plan		✓		✓
Hanford Biological Resources Management Plan		✓		✓
Hanford Bald Eagle Management Plan			✓	✓
Fire Management Plan			✓	✓
Noxious Weed Management Plan			✓	✓
Chinook Salmon - Upper Columbia River Spring run Hanford Management Plan	✓			
Steelhead - Middle Columbia River run Hanford Management Plan	✓			
Steelhead Upper Columbia River run Hanford Management Plan		✓		
Aesthetic and Visual Resources Management Plan	✓			
Facility and Infrastructure Assessment and Strategy		✓		
Mineral Resources Management Plan (i.e., soils, sand, gravel, and basalt)	✓			
Hanford Site Watershed Management Plan	✓			
Hanford Site Ground-Water Protection Management Plan			✓	
Groundwater Vadose Zone Integration Project Summary Description			✓	
Hanford Institutional Control Plan (i.e., long-term stewardship plan)	✓			
Area Management Plans (AMPs)	To Be Prepared	Current Draft	Current Final	Revision Planned
ALE Reserve Comprehensive Conservation Plan			✓	✓
Wahluke Slope Comprehensive Conservation Plan	✓			
Columbia River Corridor Area Management Plan	✓			
South 600 Area Management Plan (includes 300 Area)	✓			

- 1 1. Identify all similar documents, policies, and procedures.
- 2
- 3 2. Review documents and associated policies and implementing procedures for
- 4 consistency with the CLUP map and policies and implementing procedures.
- 5
- 6 3. Identify changes necessary to align documents and associated policies and
- 7 implementing procedures with the provisions of the CLUP.
- 8
- 9 4. Prepare recommendations to amend existing documents and associated policies
- 10 and implementing procedures so they are consistent with and carry out the CLUP.
- 11
- 12 5. Prepare new RMPs and AMPs.
- 13
- 14 6. Submit CLUP Amendments and new RMPs and AMPs to the REO for review as
- 15 Special Use Requests so these changes may be integrated with the CLUP
- 16 implementation procedures as standards for project review (see Figures 6-1 and
- 17 6-2).
- 18
- 19 7. Integrate the prescribed and coordinated process for applying the provisions of the
- 20 documents into the RL Implementing Directive for the CLUP (Table 6-4).
- 21

22 **6.6.3 Mission-Related Program and Contractor Integration**

23
24 The CLUP map and policies would be integrated with and addressed at the threshold
25 decision points of all authorizations, operational plans (e.g., the current Hanford Strategic Plan),
26 and actions considered in RCRA, CERCLA, NEPA and SEPA reviews. This includes contracts
27 and budget proposals that directly or indirectly affect land use on the Site.

28 **6.6.4 Establishment of Site Planning Advisory Board**

29
30
31 The establishment and seating of the SPAB (see Figures 6-1 and 6-2) shall be
32 accomplished within two months from the issuance of the HCP EIS ROD. Prescribed SPAB
33 charter and guidelines would need to be developed by this board and DOE.

34 **6.6.5 Amendments to the Comprehensive Land-Use Plan**

35
36
37 The CLUP is a living document designed to hold a chosen course over an extended
38 period of development and management of resources, yet the plan is flexible enough to
39 accommodate a wide spectrum of both anticipated and unforeseen mission conditions. A
40 fundamentally good plan can do this for a relatively short period of time (five years), during
41 which monitoring, data gathering, and analysis for the purposes of "fine tuning" and improving
42 the plan by Amendment should be an ongoing program. It is recommended that a
43 reassessment of the CLUP should occur every 5 years, in the form of a NEPA Supplemental
44 Analysis per 10 CFR 1021.

7.0 Consultations, Laws, and Requirements

This chapter summarizes the major laws, regulations, Executive Orders, and U.S. Department of Energy (DOE) regulations, orders, and agreements that might apply to Hanford Site land uses. The Federal, Tribal, state, and local agencies that were consulted by DOE during the preparation of the HRA-EIS are also identified.

7.1 Federal Laws

Relevant laws of the United States that might apply to the implementation of the land-use alternatives at the Hanford Site are discussed in the sections that follow.

7.1.1 Treaties of the United States with American Indian Tribes of the Hanford Region

In May and June of 1855, at Wai-i-lat-pu (near present-day Walla Walla, Washington), leaders of various Columbia Plateau American Indian Tribes and Bands negotiated treaties with representatives of the United States. The negotiations resulted in 3 treaties, one with the 14 Tribes and bands of what would become the Confederated Tribes and Bands of the Yakama Nation, one with the 3 Tribes that would become the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and one with the Nez Perce Tribe. The treaties were ratified by the U.S. Senate in 1859. The negotiated treaties are as follows:

- *Treaty with the Walla Walla, Cayuse, etc.* (June 9, 1855; 12 Stat. 945)
- *Treaty with the Yakama* (June 9, 1855; 12 Stat. 951)
- *Treaty with the Nez Perce* (June 11, 1855; 12 Stat. 957).

The terms of all three treaties are essentially the same. Each of the three Tribal organizations agreed to cede large blocks of land to the United States. The Tribes retained certain lands for their exclusive use (the three reservations) and also retained the rights to continue traditional activities outside the reservations. These reserved rights include the right to fish (and erect fish-curing facilities) at usual and accustomed places. These rights also include rights to hunt, gather foods and medicines, and pasture livestock on open and unclaimed lands.

The act of treaty-making between the United States and an Indian Tribe has many legal consequences for both entities. The United States recognizes the existence of the Tribe as a sovereign and initiates a government-to-government relationship with the Tribe. At the same time, the Tribe loses some aspects of its sovereignty, such as the right to negotiate (independently of the United States) with other foreign powers. In return, the United States and the Tribe enter into a trust relationship, whereby the United States assumes the responsibility to preserve the rights and resources of the Tribe from incursions by private entities, states, or the Federal government itself. One aspect of this trust duty is the need to consult with the Tribes concerning decisions made by the Federal government that could affect Tribal rights or resources. In addition to these general legal consequences of treaty-making, the individual treaty itself defines particular new roles and responsibilities of the two governments, within the terms of the new legal relationship created by the treaty.

Every Federal agency that makes decisions potentially affecting the rights or resources of federally recognized American Indian Tribes shares in the trust responsibility duties of the Federal government. This trust responsibility includes the duty to consult with those Tribes concerning the potential impacts of agency decisions. As a result, DOE regularly consults with the CTUIR, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce

1 Tribe concerning decisions being made by DOE on the Hanford Site that might affect Tribal
2 rights or resources. Land-use planning decisions are within the realm of such decisions. DOE
3 invited all affected Tribes to participate in the drafting of the HRA-EIS. The U.S. Department of
4 Energy, Richland Operations Office (RL) will continue to consult with these Tribes during the
5 further development and implementation of this environmental impact statement (EIS). Copies
6 of the Treaties are presented in Appendix A.
7

8 **7.1.2 International Treaties of the United States**

9
10 **7.1.2.1 Migratory Bird Treaty Act of 1918.** The *Migratory Bird Treaty Act of 1918*, as
11 amended, is intended to protect birds that have common migration patterns between the United
12 States and Canada, Mexico, Japan, and Russia. The law regulates the harvest of migratory
13 birds by specifying factors such as the mode of harvest, hunting seasons, and bag limits. This
14 Act stipulates that, except as permitted by regulations, it is unlawful at any time, by any means,
15 or in any manner to "kill . . . any migratory bird." The DOE is required to consult with the U.S.
16 Fish and Wildlife Service (USFWS) regarding impacts to migratory birds and to evaluate ways
17 to avoid or minimize impacts in accordance with the USFWS migration policy.
18

19 **7.1.2.2 Pacific Salmon Treaty Act of 1985.** The *Pacific Salmon Treaty Act of 1985* ratified a
20 treaty between the United States and Canada concerning Pacific salmon. The law is intended
21 to protect and maintain Pacific salmon fisheries by regulating the fishing season. The law
22 establishes panels with jurisdiction over certain areas. Associated regulations close the panel
23 area to sockeye and pink salmon fishing unless opened by panel regulations or by in season
24 orders of the Secretary of Commerce that give the effect to panel orders.
25

26 **7.1.3 Federal Natural Resource Management, Pollution Control, and Cultural Resource** 27 **Laws**

28
29 **7.1.3.1 National Environmental Policy Act of 1969.** The *National Environmental Policy Act*
30 *of 1969* (NEPA), as amended, establishes a national policy that encourages awareness of the
31 environmental consequences of human activities and promotes consideration of those
32 environmental consequences during the planning and implementing stages of a project. Under
33 NEPA, Federal agencies are required to prepare detailed statements to address the
34 environmental effects of proposed major Federal actions that might significantly affect the
35 quality of the human environment. The HRA-EIS has been prepared in accordance with NEPA
36 requirements and policies, and presents reasonable alternatives and the potential
37 environmental consequences of those alternatives.
38

39 **7.1.3.2 Clean Air Act of 1970.** The *Clean Air Act of 1970* (CAA), as amended, is intended to
40 "protect and enhance the quality of the Nation's air resources so as to promote the public health
41 and welfare and the productive capacity of its population." Section 118 of the CAA requires
42 each Federal agency, with jurisdiction over properties or facilities engaged in any activity that
43 might result in the discharge of air pollutants, to comply with all Federal, state, interstate, and
44 local requirements with regard to the control and abatement of air pollution.
45

46 Under Section 109 of the CAA, the U.S. Environmental Protection Agency (EPA) is
47 required to establish national ambient air quality standards (NAAQS) that protect public health
48 from known or anticipated adverse effects of a regulated pollutant. Section 111 of the CAA
49 requires establishment of national performance standards for new or modified stationary
50 sources of atmospheric pollutants. Specific emission increases must be evaluated in order to
51 prevent significant deterioration of air quality. Hazardous air pollutants, including radionuclides,
52 are regulated separately. Emissions of air pollutants are regulated by the EPA in 40
53 CFR 50-99. Radionuclide emissions and hazardous air pollutants are regulated under the
54 National Emissions Standards for Hazardous Air Pollutants Program (40 CFR 61 and
55 40 CFR 63).

1 **7.1.3.3 Safe Drinking Water Act of 1974.** The primary objective of the *Safe Drinking Water*
2 *Act of 1974* (SDWA), as amended, is to protect the quality of the public water supply and
3 sources of drinking water. In the State of Washington, the EPA has the authority to implement
4 regulations to establish standards applicable to public water systems. These regulations further
5 establish the maximum contaminant levels, including maximum levels of radioactivity, that are
6 allowed in public drinking water systems. The EPA has promulgated the SDWA requirements
7 in 40 CFR 140-149. Current regulations (40 CFR 141) specify that the average annual
8 concentration of beta particle and photon radioactivity from man-made radionuclides in drinking
9 water shall not produce an annual dose equivalent to the total body or any internal organ
10 greater than 4 mrem/yr. Revisions to the limits regulating radionuclides have been proposed by
11 the EPA.

12
13 Other programs established by the SDWA include the Sole Source Aquifer Program, the
14 Wellhead Protection Program, and the Underground Injection Control Program.

15
16 **7.1.3.4 Clean Water Act of 1977.** The *Clean Water Act of 1977* (CWA), as amended, was
17 enacted to "restore and maintain the chemical, physical and biological integrity of the Nation's
18 water." The CWA prohibits "discharge of toxic pollutants in toxic amounts" to navigable waters
19 of the United States. Section 313 of the CWA requires all branches of the Federal government
20 with jurisdiction over properties or facilities engaged in any activity that might result in a
21 discharge or runoff of pollutants to surface waters, to comply with Federal, state, interstate, and
22 local requirements.

23
24 In addition to setting water quality standards for waterways, the CWA provides
25 guidelines and limitations for effluent discharges from point sources and gives authority for the
26 EPA to implement the National Pollutant Discharge Elimination System (NPDES) Permitting
27 Program. The NPDES Program is administered by the Water Management Division of the EPA
28 (40 CFR 122).

29
30 In 1987, the CWA was amended and EPA was required to establish regulations for
31 issuing permits for stormwater discharges associated with industrial activity. Stormwater
32 discharges are permitted through the NPDES Program, and general permit requirements are
33 published in 40 CFR 122.

34
35 **7.1.3.5 Resource Conservation and Recovery Act of 1976.** Treatment, storage, and/or
36 disposal of hazardous and nonhazardous waste is regulated under the *Solid Waste Disposal*
37 *Act of 1965*, which was amended by the *Resource Conservation and Recovery Act of 1976*
38 (RCRA), and the *Hazardous and Solid Waste Amendments of 1984*. Any state that seeks to
39 administer and enforce a hazardous waste program pursuant to RCRA may apply for EPA
40 authorization of the state program. The Washington State Department of Ecology (Ecology)
41 has been delegated the authority for implementing the Federal RCRA program in the State of
42 Washington. The EPA regulations implementing RCRA define hazardous wastes and specify
43 the transportation, handling, and waste management requirements of these wastes
44 (40 CFR 260-280).

45
46 The *Federal Facilities Compliance Act of 1992* (FFCA) amends RCRA and waives
47 sovereign immunity for fines and penalties for RCRA violations at Federal facilities. A provision
48 of the FFCA postpones fines and penalties for three years for mixed waste storage prohibition
49 violations at DOE sites and requires DOE to prepare plans for developing the required
50 treatment capacity for mixed waste stored or generated at each facility. Each plan must be
51 approved by the host state or the EPA, after consultation with other affected states, and a
52 consent order requiring compliance with the plan must be issued by the regulator. The FFCA
53 also states that DOE will not be subject to fines and penalties for land disposal restriction
54 storage prohibition violations for mixed waste as long as DOE is in compliance with an
55 approved plan and consent order and meets all other applicable regulations.

1 **7.1.3.6 Comprehensive Environmental Response, Compensation, and Liability Act of**
2 **1980.** The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
3 (CERCLA) provides a statutory framework for the remediation of waste sites containing
4 hazardous substances and, as amended by the *Superfund Amendments and Reauthorization*
5 *Act of 1986* (SARA), an emergency response program in the event a release (or threat of a
6 release) of a hazardous substance to the environment occurs. Using a hazard ranking system,
7 Federal and private contaminated sites are ranked and may be included on the National
8 Priorities List. CERCLA requires Federal facilities with contaminated sites to undertake
9 investigations, remediation, and natural resource restoration, as necessary.

10
11 **7.1.3.7 Emergency Planning and Community Right-to-Know Act of 1986.** Under Subtitle A
12 of the *Emergency Planning and Community Right-to-Know Act of 1986*, also known as the
13 *Superfund Amendments and Reauthorization Act of 1986* (SARA Title III), Federal facilities are
14 required to provide information regarding the inventories of chemicals used or stored at a site
15 and releases from that site to the State Emergency Response Commission and the Local
16 Emergency Planning Committee. This requirement ensures that emergency plans are sufficient
17 to respond to unplanned releases of hazardous substances. Implementation of provisions in
18 the *Emergency Planning and Community Right-to-Know Act of 1986* began voluntarily in 1987;
19 inventory and emissions reporting began in 1988 based on 1987 activities and information. The
20 requirements of the *Emergency Planning and Community Right-to-Know Act of 1986* are
21 promulgated by the EPA in 40 CFR 350-372. The DOE requires compliance with SARA
22 Title III.

23
24 **7.1.3.8 Toxic Substances Control Act of 1976.** The *Toxic Substances Control Act of 1976*
25 (TSCA) provides the EPA with the authority to require testing of chemical substances (both new
26 and old) entering the environment and, where necessary, to regulate those chemicals. The law
27 complements and expands other toxic substance laws such as Section 112 of the CAA and
28 Section 307 of the CWA. The TSCA was enacted because there were no Federal regulations
29 requiring evaluation of potential environmental or health effects from the thousands of
30 chemicals being developed and released to the public or commerce annually. The TSCA also
31 regulates the treatment, storage, and disposal of certain toxic substances (e.g., polychlorinated
32 biphenyls, chlorofluorocarbons, asbestos, dioxins, certain metal-working fluids, and hexavalent
33 chromium).

34
35 **7.1.3.9 Pollution Prevention Act of 1990.** The *Pollution Prevention Act of 1990* establishes a
36 national policy for waste management and pollution control. This Act focuses first on source
37 reduction, followed sequentially by environmentally safe recycling and treatment and, as a last
38 resort, disposal or other release into the environment. The DOE has committed to participation
39 in Section 313 of SARA, the EPA 33/50 Pollution Prevention Program. The goal for facilities
40 involved in Section 313 compliance is a 33 percent reduction in releases of 17 priority
41 chemicals by 1997 (based on a 1993 baseline). On August 3, 1993, Executive Order 12856
42 was issued. This Executive Order expands the 33/50 Pollution Prevention Program and
43 requires DOE to reduce total releases of all toxic chemicals by 50 percent by December 31,
44 1999. Each DOE site is, therefore, establishing site-specific goals to reduce generation of all
45 waste types.

46
47 **7.1.3.10 National Historic Preservation Act of 1966.** The *National Historic Preservation Act*
48 *of 1966*, as amended, requires nomination for placement of sites with significant national
49 historic value on the National Register of Historic Places (NPS 1988). Permits and certifications
50 are not required under this Act; however, consultation with the Advisory Council on Historic
51 Preservation is required if a Federal undertaking might impact a historic property resource.
52 This consultation generally results in a Memorandum of Agreement (MOA) that includes
53 stipulations to minimize adverse impacts to the historic resource. Coordination with the State
54 Historic Preservation Office is undertaken to ensure that potentially significant sites are properly
55 identified and appropriate mitigation measures are implemented.

1 **7.1.3.11 Archaeological Resources Protection Act of 1979.** The *Archaeological Resources*
2 *Protection Act of 1979*, as amended, requires a permit for any excavation or removal of
3 archaeological resources from Federal or Indian lands. Excavations must be undertaken for
4 the purpose of furthering archaeological knowledge in the public interest, and resources
5 removed are to remain the property of the United States. Consent must be obtained from the
6 Indian Tribe or the Federal agency having authority over the land on which a resource is located
7 before issuance of a permit; the permit must contain terms and conditions requested by the
8 Tribe or Federal agency.
9

10 **7.1.3.12 Native American Graves Protection and Repatriation Act of 1990.** The *Native*
11 *American Graves Protection and Repatriation Act of 1990* directs the Secretary of the Interior to
12 guide Federal agencies in the repatriation of Federal archaeological collections and collections
13 affiliated culturally to American Indian Tribes, which are currently held by museums receiving
14 Federal funding. This Act established statutory provisions for the treatment of inadvertent
15 discoveries of American Indians' remains and cultural objects. Specifically, when discoveries
16 are made during ground disturbing activities, the following must take place: (1) activity in the
17 area of the discovery must cease immediately, (2) reasonable efforts must be made to protect
18 the items discovered, (3) notice of discovery must be given to the agency head (DOE) and the
19 appropriate Tribes, and (4) a period of 30 days must be set aside following notification for
20 negotiations regarding the appropriate disposition of these items.
21

22 **7.1.3.13 American Indian Religious Freedom Act of 1978.** The *American Indian Religious*
23 *Freedom Act of 1978* reaffirms American Indians' religious freedom under the First Amendment
24 and sets United States policy to protect and preserve the inherent and constitutional right of
25 American Indian Tribes to believe, express, and exercise traditional religions. This Act also
26 requires that Federal agencies avoid interfering with access to sacred locations and traditional
27 resources that are integral to the practice of religion.
28

29 **7.1.3.14 Endangered Species Act of 1973.** The *Endangered Species Act of 1973*, as
30 amended, is intended to prevent further decline of endangered and threatened species and to
31 restore those species and their habitats. This Act is jointly administered by the Departments of
32 Commerce and Interior. Section 7 of this Act requires agencies to consult with the USFWS or
33 the National Marine Fisheries Service. This consultation determines whether endangered and
34 threatened species or critical habitats are known to be in the vicinity of a proposed action, and
35 whether an action will adversely affect listed species or designated critical habitats.
36

37 **7.1.3.15 Bald and Golden Eagle Protection Act of 1972.** The *Bald and Golden Eagle*
38 *Protection Act of 1972*, as amended, makes it unlawful to take, pursue, molest, or disturb bald
39 and golden eagles, their nests, or their eggs anywhere in the United States. A permit must be
40 obtained from the U.S. Department of the Interior (DOI) to relocate a nest that interferes with
41 resource development or recovery operations.
42

43 **7.1.3.16 Wild and Scenic Rivers Act of 1968.** The *Wild and Scenic Rivers Act of 1968*, as
44 amended, protects selected national rivers possessing outstanding scenic, recreational,
45 geological, fish and wildlife, historical, cultural, or other similar values. These rivers are to be
46 preserved in a free-flowing condition to protect water quality and for other vital national
47 conservation purposes. This Act also instituted a National Wild and Scenic Rivers system,
48 designated the initial rivers within the system, and developed standards for the addition of new
49 rivers in the future.
50

51 **7.1.3.17 Nuclear Waste Policy Act of 1982.** The *Nuclear Waste Policy Act of 1982*, as
52 amended, authorizes Federal agencies to develop a geologic repository for the permanent
53 disposal of spent nuclear fuel and high-level radioactive waste. This Act specifies the process
54 for selecting a repository site and constructing, operating, closing, and decommissioning the
55 repository, and also establishes programmatic guidance for these activities.

1 **7.1.3.18 Atomic Energy Act of 1954.** The *Atomic Energy Act of 1954* (AEA), as amended,
2 authorizes DOE to establish standards to protect health or minimize dangers to life or property
3 with respect to activities under DOE jurisdiction. The DOE has used a series of departmental
4 orders to establish an extensive system of standards and requirements to ensure safe
5 operation of DOE facilities.
6

7 The AEA and related statutes give EPA the responsibility and authority for developing
8 applicable environmental standards for protection of the general environment from radioactive
9 materials. The EPA has promulgated several regulations under this authority.
10

11 **7.1.3.19 Occupational Safety and Health Act of 1970.** The *Occupational Safety and Health*
12 *Act of 1970*, as amended, establishes standards to enhance safe and healthy working
13 conditions in places of employment throughout the United States. The *Occupational Safety and*
14 *Health Act of 1970* is administered and enforced by the Occupational Safety and Health
15 Administration (OSHA), a U.S. Department of Labor agency. Although the OSHA and the EPA
16 both have a mandate to limit exposures to toxic substances, the jurisdiction of the OSHA is
17 limited to safety and health conditions in the workplace. In general, each employer is required
18 to furnish a place of employment free of recognized hazards likely to cause death or serious
19 physical harm to all employees. The OSHA regulations establish specific standards telling
20 employers what must be done to achieve a safe and healthy working environment. Employees
21 have a duty to comply with these standards and with all rules, regulations, and orders issued by
22 OSHA.
23

24 The DOE places emphasis on compliance with OSHA regulations at DOE facilities.
25 Through DOE orders, DOE prescribes that contractors shall meet OSHA standards applicable
26 to work at government-owned, contractor-operated facilities. The DOE maintains and makes
27 available the various records of minor illnesses, injuries, and work-related deaths, as required
28 by OSHA regulations.
29

30 **7.1.3.20 Comprehensive Conservation Study of the Hanford Reach of the Columbia**
31 **River, Public Law 100-605.** Public Law 100-605, passed by Congress on November 4, 1988,
32 authorizes a comprehensive study of the Hanford Reach of the Columbia River to identify the
33 outstanding features of the Hanford Reach and its immediate environment (including fish and
34 wildlife, geologic, scenic, recreational, natural, historical, and cultural values), and to examine
35 alternatives for their preservation. The Secretary of the Interior has affirmed the addition of the
36 Hanford Reach to the National Wild and Scenic Rivers System and is waiting for Congressional
37 action to implement the decision.
38

39 The Secretary of the Interior is charged with reviewing proposed actions within the study
40 corridor to determine if there will be a direct and adverse effect on the values for which the
41 Hanford Reach is under study and, if so, to provide recommendations for mitigation. In 1996,
42 Public Law 104-333, *Omnibus Parks and Public Lands Management Act of 1996*, was enacted.
43 Section 404 of this Act amended Public Law 100-605 to extend the Secretary's environmental
44 review responsibility indefinitely and permanently prohibited any damming, dredging, or
45 navigation project within the Hanford Reach.
46

47 **7.1.3.21 Mining Law of 1872, as amended.** The *Mining Law of 1872*, as amended, permits
48 prospecting and mining on the unappropriated public domain for hardrock minerals (the
49 Hanford Site is not considered unappropriated public domain). Congress declared that it is the
50 continuing policy of the Federal government to foster and encourage private enterprise in (1)
51 the development of economically sound and stable domestic mining, minerals, metals and
52 mineral reclamation industries; (2) the economic development of domestic mineral resources,
53 reserves, and reclamation of metals and minerals; (3) mining, mineral, and metallurgical
54 research, including the use and recycling of scrap to promote the efficient use of natural and
55 reclaimable resources; and (4) the study and development of methods for the disposal, control,

1 and reclamation of mineral waste products and the reclamation of mined land, to lessen the
2 adverse impact of mineral extraction and processing on the physical environment.

3
4 **7.1.3.22 Archeological and Historic Preservation Act of 1974.** The *Archaeological and*
5 *Historic Preservation Act of 1974*, as amended, protects sites that have historic and prehistoric
6 importance.

7
8 **7.1.3.23 Fish and Wildlife Conservation Act of 1980.** The *Fish and Wildlife Conservation*
9 *Act of 1980*, as amended, encourages all Federal entities (in cooperation with the public) to
10 protect and conserve the nation's fish and wildlife.

11
12 **7.1.3.24 Fish and Wildlife Coordination Act of 1934.** The *Fish and Wildlife Coordination Act*
13 *of 1934*, as amended, promotes more effectual planning and cooperation between Federal,
14 state, public, and private agencies for the conservation and rehabilitation of the nation's fish and
15 wildlife and authorizes the DOI to provide assistance.

16
17 **7.1.3.25 National Wildlife Refuge System Administration Act of 1966 (as amended by the**
18 **National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57).** The
19 *National Wildlife Refuge System Administration Act of 1966*, as amended, provides guidelines
20 and directives for the administration and management of all lands within the system, including
21 "wildlife refuges, areas for the protection and conservation of fish and wildlife that are
22 threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or
23 waterfowl production areas." The Secretary of the Interior is authorized to permit by regulations
24 the use of any area within the system provided "such uses are compatible with the major
25 purposes for which such areas were established."

26
27 **7.1.3.26 Noise Control Act of 1972.** The *Noise Control Act of 1972*, as amended, directs all
28 Federal agencies to carry out, to the fullest extent within agency authority, programs within
29 agency jurisdiction in a manner that furthers a national policy of promoting an environment free
30 from noise that jeopardizes health and welfare.

31
32 **7.1.3.27 American Antiquities Preservation Act of 1906.** The *American Antiquities*
33 *Preservation Act of 1906*, as amended, protects historic and prehistoric ruins, monuments, and
34 antiquities, including paleontological resources, on federally controlled lands.

35
36 **7.1.3.28 Federal Insecticide, Fungicide, and Rodenticide Act of 1972.** The *Federal*
37 *Insecticide, Fungicide, and Rodenticide Act of 1972*, as amended, governs the storage, use,
38 and disposal of pesticides through product labeling, registration, and user certification.

39
40 **7.1.3.29 Federal Land Policy and Management Act of 1976.** The *Federal Land Policy and*
41 *Management Act of 1976*, as amended, governs the use of Federal lands which may be
42 overseen by several agencies and establishes the procedure for applying to the U.S. Bureau of
43 Land Management (BLM) for land withdrawals and right-of-ways.

44
45 **7.1.3.30 Federal Water Pollution Control Act Amendments of 1972.** The *Federal Water*
46 *Pollution Control Act Amendments of 1972* is the predecessor Federal statute to the *Clean*
47 *Water Act of 1977*.

48
49 **7.1.3.31 Historic Sites, Buildings, and Antiquities Act of 1965.** The *Historic Sites,*
50 *Buildings, and Antiquities Act of 1965* sets national policy to preserve historic sites, buildings,
51 and antiquities for the inspiration and benefit of the people of the United States.

52
53 **7.1.3.32 Materials Act of 1947.** The *Materials Act of 1947* provides for the management of
54 minerals, timber, and other construction resource materials on public lands.

1 **7.1.3.33 Federal Urban Land-Use Act of 1949.** The *Federal Urban Land-Use Act of 1949*
2 was enacted to promote harmonious intergovernmental relations. The Act also encourages
3 sound planning, zoning, and land-use practices by prescribing uniform policies and
4 implementing procedures in order that land transactions entered into for the General Services
5 Administration or on behalf of other Federal agencies be consistent with zoning and land-use
6 practices and be made in accordance with planning and development objectives of local
7 governments and local planning agencies concerned.
8

9 **7.1.3.34 National Defense Authorization Act, Public Law 104-201.** Section 3153 of the
10 National Defense Authorization Act requires DOE to develop a future-use plan for defense
11 nuclear facilities, including the Hanford Site. The future-use plans required under this section
12 must address a planning period of at least the next 50 years. The DOE prepared an overview
13 report, *Planning for the Future, An Overview of Future Use Plans at Department of Energy*
14 *Sites*, which provided a summary of the future land-use planning processes at the Hanford Site,
15 the Idaho National Engineering and Environmental Laboratory, the Rocky Flats Environmental
16 Technology Site, and the Savannah River Site. This overview report was delivered to Congress
17 on October 7, 1998. In addition, DOE submitted the current future-use plans for three of the
18 above four sites, excluding Hanford. Hanford's CLUP will be delivered to members of Congress
19 with the distribution of this Final HCP EIS.
20
21

22 **7.2 State Laws**

23
24 State and local statutes also apply to activities at the Hanford Site when Federal law
25 delegates enforcement or implementation authority to state or local agencies. In general, state
26 laws do not apply to the Federal government based on the National Supremacy Clause that
27 reads, "This constitution, and the laws of the United States which shall be made in pursuance
28 thereof; and all treaties made, or which shall be made, under the authority of the United States,
29 shall be the supreme law of the land; and the judges in every state shall be bound thereby, any
30 thing in the constitution or laws of any state to the contrary notwithstanding" (Article 4, U.S.
31 Constitution).
32

33 **7.2.1 State Environmental Policy Act of 1971**

34
35 The Washington State legislature enacted the *State Environmental Policy Act of 1971*
36 (SEPA). The statute was amended in 1983, and new implementing regulations (the SEPA
37 rules) were adopted and codified by Ecology in 1984 as *Washington Administrative Code*
38 (WAC) 197-11. The purpose and policy sections of the statute are extremely broad, including
39 recognition by the legislature that "each person has a fundamental and inalienable right to a
40 healthful environment. . . ." SEPA contains a substantive mandate that "policies, regulations,
41 and laws of the State of Washington shall be interpreted and administered in accordance with
42 the policies set forth in [SEPA]."
43

44 SEPA applies to all branches of state government, including state agencies, municipal
45 and public corporations, and counties. It requires each agency to develop procedures
46 implementing and supplementing SEPA requirements and rules. Although the SEPA does not
47 apply directly to Federal actions, the term "government action" with respect to state agencies is
48 defined to include the issuance of licenses, permits, and approvals. Thus, as in NEPA,
49 proposals (Federal, state, or private) are evaluated, and may be conditioned or denied through
50 the permit process, based on environmental considerations. SEPA does not create an
51 independent permit requirement, but overlays all existing agency permitting activities.
52

53 **7.2.2 Hazardous Waste Management Act of 1976**

1 The Federal RCRA program allows state enforcement if the state program is consistent
2 with the Federal program and is at least as stringent. Through the *Hazardous Waste*
3 *Management Act of 1976*, Ecology has enacted hazardous waste regulations that are
4 consistent with and as stringent as (or more stringent than) the Federal program. Washington
5 has been delegated authority to implement RCRA and *Hazardous and Solid Waste*
6 *Amendments of 1984* programs. Regulated parties must comply with the requirements of both
7 the Federal program, pursuant to regulations in 40 CFR 260-280, and the state program,
8 pursuant to the requirements of the *Hazardous Waste Management Act of 1976* and
9 WAC 173-303, "Dangerous Waste Regulations."

10 **7.2.3 Model Toxics Control Act of 1989**

11
12
13 The State of Washington has adopted a statutory "Superfund" scheme for identifying
14 and responding to releases of hazardous substances. Known as the *Model Toxics Control Act*
15 *of 1989* (MTCA), the State of Washington law supplements CERCLA. Under this Act, Ecology
16 must investigate and prioritize hazardous waste release sites, provide technical assistance to
17 "potentially liable parties" desiring to perform cleanups, set cleanup standards for hazardous
18 substances, undertake cleanups where appropriate, require and assist in or perform cleanups,
19 provide opportunities for public involvement, establish a scientific advisory board, and regularly
20 report to the legislature. The statute empowers Ecology to gain access to property, enter into
21 settlements (either through administrative orders or consent decrees), file actions or issue
22 orders to compel cleanups, and impose civil penalties and seek recovery of state cleanup costs.
23

24 **7.2.4 Water Pollution Control Act of 1945**

25
26 The *Water Pollution Control of 1945*, as amended, establishes a permit system to
27 license and control the discharge of pollutants into waters of the state. Under the permit
28 system, dischargers must reduce releases to a level determined to be technologically and
29 economically achievable, regardless of the condition of the receiving water. Dischargers also
30 must maintain or improve the condition of the receiving water. The state has a general policy
31 prohibiting degradation of existing water quality, and a variety of approaches are used to
32 address the problem of toxic pollutants. Permits are required for both point-source and
33 nonpoint-source discharges.
34

35 **7.2.5 Growth Management Act of 1989**

36
37 Most planning by local governments falls under the *State of Washington Growth*
38 *Management Act* (GMA), which established a state-wide planning framework and created roles
39 and responsibilities for planning at the local, regional, and state levels. The GMA required the
40 largest and fastest growing counties (counties with more than 50,000 people or with a
41 population growth of more than 20 percent in the past 10 years) and cities within those counties
42 to develop new comprehensive plans. Counties not required to plan may elect to do so.
43 Benton, Franklin, and Grant counties, along with the City of Richland, have elected to plan
44 under the GMA requirements. Jurisdictions under GMA must prepare comprehensive plans
45 that project growth for a minimum of 20 years.
46

47 **7.2.6 Air Quality Regulations**

48
49 Most of the provisions of the *Washington Clean Air Act of 1991* (WCAA) mirror the
50 requirements of the *Federal Clean Air Act Amendments of 1990* (Federal CAAA). The
51 Federal CAAA establishes a minimum or "floor" for Washington air quality programs. The
52 WCAA authorizes Ecology and local air pollution control authorities to implement programs
53 consistent with the Federal CAAA. For example, the WCAA authorizes an operating permit
54 program, enhanced civil penalties, new administrative enforcement provisions, motor vehicle
55 inspections, and provisions addressing ozone and acid rain.

1 Washington State also has an extensive set of regulations governing toxic air pollutants
2 (TAPs) (WAC 173-460). These regulations are similar to the programs for regulating
3 hazardous air pollutants (HAP) required by the Federal CAAA. In contrast to the Federal CAAA
4 HAPs program, which applies to new and existing emission sources, the TAP rules apply only
5 to new sources of TAPs, including any modification of an existing source where the modification
6 will increase TAP emissions. Furthermore, Ecology refers to a list of more than 450 individual
7 chemicals that are deemed to be TAPs. The list overlaps with the Federal CAAA list of HAPs,
8 but is considerably longer. The TAP rules are implemented under the New Source Review
9 Program, and the regulatory standard for TAPs is "best available control technology."

10
11 The Washington State Department of Health regulations, "Radiation Protection—Air
12 Emissions" (WAC 246-247), contain standards and permit requirements for the emission of
13 radionuclides to the atmosphere from DOE facilities based on Ecology standards, "Ambient Air
14 Quality Standards and Emission Limits for Radionuclides" (WAC 173-480).

15
16 The local air authority, Benton County Clean Air Authority, enforces regulations
17 pertaining to detrimental effects, fugitive dust, incineration products, odor, opacity, asbestos,
18 and sulfur oxide emissions. The Benton County Clean Air Authority also has been delegated
19 authority to enforce the EPA asbestos regulations.

20 21 **7.2.7 The Shoreline Management Act of 1971**

22
23 The *Shoreline Management Act of 1971* (RCW 90.58) uses authority passed to the state
24 by the *Federal Rivers and Harbors Act of 1899* (33 U.S.C. 401-413; Section 407, referred to as
25 the *Refuse Act*). Section 10 of the *Rivers and Harbors Act of 1899* prohibits the unauthorized
26 obstruction or alteration of any navigable waters of the United States. Examples of activities
27 requiring a U.S. Army Corps of Engineers permit (33 CFR 322) include constructing a structure
28 in or over any waters of the United States, excavation or deposit of material in such waters, and
29 various types of work performed in such waters, including fill and stream channelization. The
30 state is considered the owner of all navigatable waterways within its boundaries.

31
32 The state has passed regulatory responsibility for the *Shoreline Management Act of*
33 *1971* to the affected county. Counties in Washington State regulate the shoreline (i.e., from the
34 high-water mark to the low-water mark) through each county's Shoreline Management Master
35 Plan and a shoreline permit system consistent with Ecology guidelines (WAC 173-16).

36 37 38 **7.3 Executive Orders**

39
40 This section identifies Presidential Executive Orders that clarify issues of national policy
41 and provide guidelines relevant to Hanford Site land-use planning.

42 43 **7.3.1 Executive Order 11593, Protection and Enhancement of the Cultural Environment**

44
45 Executive Order 11593 requires Federal agencies to direct their policies, plans, and
46 programs in a way that preserves, restores, and maintains federally owned sites, structures,
47 and objects of historical or archaeological significance.

1
2 **7.3.2 Executive Order 11988, Floodplain Management**
3

4 Executive Order 11988 directs Federal agencies to establish procedures to ensure that
5 the potential effects of flood hazards and floodplain management are considered for actions
6 undertaken in a floodplain. The Order further directs that floodplain impacts are to be avoided
7 to the extent practicable.
8

9 **7.3.3 Executive Order 11990, Protection of Wetlands**
10

11 Governmental agencies are directed by Executive Order 11990 to avoid, to the extent
12 practicable, any short- and long-term adverse impacts on wetlands wherever there is a
13 practicable alternative. The DOE has issued regulations for compliance with this Order and
14 Executive Order 11988 (10 CFR 1022).
15

16 **7.3.4 Executive Order 12088, Federal Compliance with Pollution Control Standards**
17

18 Executive Order 12088 was issued on October 13, 1978. This Order directs Federal
19 agencies to comply with applicable administrative and procedural pollution control standards
20 established by, but not limited to, the CWA, the CAA, the SDWA, TSCA, and RCRA. This
21 Order was amended by Executive Order 12580, issued on January 23, 1987.
22

23 **7.3.5 Executive Order 12372, Intergovernmental Review of Federal Programs**
24

25 Executive Order 12372 applies to state review of NEPA documents and to the
26 coordination of state and Federal NEPA processes. The goal of this Executive Order is to
27 foster an intergovernmental partnership and a strengthened coordination and consultation
28 process.
29

30 **7.3.6 Executive Order 12411, Government Work Space Management Reforms**
31

32 Executive Order 12411 requires the heads of all Federal executive agencies to establish
33 programs to reduce the amount of work space, used or held, to that amount which is essential
34 for known agency missions; to produce and maintain a total inventory of work space and related
35 furnishings and declare excess to the Administrator of General Services all such holdings that
36 are not necessary to satisfy existing or known and verified planned programs; and to ensure
37 that the amount of office space used by each employee of the agency, or others using agency-
38 controlled space, is held to the minimum necessary to accomplish the task that must be
39 performed.
40

41 **7.3.7 Executive Order 12512, Federal Real Property Management**
42

43 Executive Order 12512 authorizes the Administrator of General Services to provide
44 government-wide policy oversight and guidance for Federal real property management. This
45 Executive Order requires all executive departments and agencies to establish internal policies
46 and systems of accountability that ensure effective use of real property in support of mission-
47 related activities, consistent with Federal policies regarding the acquisition, management, and
48 disposal of such assets. All such agencies shall also develop annual real property
49 management improvement plans that include clear and concise goals and objectives related to
50 all aspects of real property management; and identify sales, work space management,
51 productivity, and excess property targets.
52

53 **7.3.8 Executive Order 12580, Superfund Implementation**
54

55 Executive Order 12580 delegates to the heads of executive departments and agencies

1 the responsibility (1) for undertaking remedial actions for releases, or threatened releases, that
2 are not on the National Priorities List; and (2) for removal actions where the release is from a
3 facility under the jurisdiction or control of executive departments and agencies.
4

5 **7.3.9 Executive Order 12856, Federal Compliance with Right-to-Know Laws** 6 **and Pollution Prevention Requirements** 7

8 Executive Order 12856 directs Federal agencies to reduce and report toxic chemicals
9 entering any waste stream; improve emergency planning, response, and accident notification;
10 and encourage clean technologies and testing of innovative prevention technologies. The
11 Executive Order also provides that Federal agencies are persons for purposes of the
12 *Emergency Planning and Community Right-to-Know Act of 1986* (SARA Title III), which obliges
13 agencies to meet the requirements of that Act.
14

15 **7.3.10 Executive Order 12866, Regulatory Planning and Review** 16

17 Executive Order 12866 requires Federal agencies to promulgate only regulations that
18 are required by law, necessary to interpret the law, or necessary by compelling public need.
19 Agencies are further required to assess costs and benefits associated with available regulatory
20 alternatives in deciding how, and whether, to regulate. This Executive Order also outlines
21 principles that agencies are to follow in the regulatory process, including avoidance of
22 regulations that are inconsistent, incompatible, or duplicative with other regulations and tailoring
23 regulations to impose the least burden on society. The Order also addresses the regulatory
24 planning and review process, including coordination of regulations and maximizing consultation
25 and resolution of conflicts at an early stage in the process. Agencies are also directed to review
26 existing regulations to determine if those regulations should be modified or eliminated.
27 Procedures for centralized review of regulations and resolution of conflicts are also identified in
28 this Executive Order. This Order revokes Executive Orders 12291 and 12498.
29

30 **7.3.11 Executive Order 12875, Enhancing the Intergovernmental Partnership** 31

32 Executive Order 12875 addresses the imposition of unfunded mandates upon State,
33 local and Tribal governments by Federal agencies. The Order directs agencies to avoid
34 promulgating regulations that create an unfunded mandate that is not required by statute unless
35 funding is available to pay costs incurred by State, local, or Tribal governments, and to develop
36 an effective process for representatives of these governments to provide meaningful and timely
37 input into the development of regulatory proposals that contain significant unfunded mandates.
38 The Order further directs agencies to increase flexibility for State and local waivers. Executive
39 Order 12875 supplements, but does not supercede, Executive Order 12866.
40

41 **7.3.12 Executive Order 12898, Federal Actions to Address Environmental Justice** 42 **in Minority Populations and Low-Income Populations** 43

44 Executive Order 12898 directs all Federal agencies, to the greatest extent practicable
45 and permitted by law, to achieve environmental justice by identifying and addressing
46 disproportionately high and adverse human health or environmental effects of agency
47 programs, policies, and activities on minority populations and low-income populations in the
48 United States and its territories and possessions. The Executive Order creates an Interagency
49 Working Group on Environmental Justice and directs each Federal agency, to the extent
50 permitted by existing law, to develop strategies to identify and address environmental justice
51 concerns. The Order further directs each Federal agency, to the extent permitted by existing
52 law, to collect, maintain, analyze, and make available information on the race, national origin,
53 income level, and other readily accessible and appropriate information for areas surrounding
54 facilities or sites expected to have a substantial environmental, human health, or economic
55 effect on the surrounding populations. This action is required when these facilities or sites

1 become the subject of a substantial Federal environmental administrative or judicial action. The
2 accompanying Presidential letter to heads of agencies identifies documents prepared under
3 NEPA as the vehicle for complying with the Order.
4

5 **7.3.13 Executive Order 13007, Indian Sacred Sites**

6
7 Executive Order 13007 directs Federal agencies to take measures to protect and
8 preserve American Indian Tribes' religious practices. Federal agencies shall, to the extent
9 practicable and permitted by law, and when consistent with essential agency functions,
10 accommodate access to and ceremonial uses of sacred sites by American Indian Tribes'
11 religious practitioners. Further, the Executive Order states that Federal agencies will comply
12 with presidential direction to maintain government-to-government relations with Tribal
13 governments.
14

15 **7.3.14 Executive Order 13045, Protection of Children from Environmental Health Risks 16 and Safety Risks**

17
18 Because a growing body of scientific knowledge demonstrates that children may suffer
19 disproportionately from environmental health and safety risks, Executive Order 13045 directs
20 each Federal agency to make it a high priority to identify and assess environmental health and
21 safety risks that may disproportionately affect children. Each Federal agency will, to the extent
22 permitted by law and appropriate, and consistent with the agency mission, ensure that its
23 policies, programs, activities, and standards address potential disproportionate risks to children.
24

25 **7.3.15 Executive Order, Invasive Species**

26
27 Issued on February 11, 1999, Executive Order 13112, *Invasive Species*, is intended to
28 prevent the introduction of invasive species and provide for their control and to minimize the
29 economic, ecological, and human health impacts that invasive species cause. The Executive
30 Order establishes an Invasive Species Council, whose members include the Secretaries of
31 numerous Federal agencies (not including DOE), and a stakeholders' Advisory Committee to
32 provide information and advice to the Council. Within 18 months after issuance of this
33 Executive Order, the Council is to have prepared and issued a National Invasive Species
34 Management Plan detailing and recommending performance-oriented goals and objectives and
35 specific measures of success for Federal agencies concerned about invasive species. The
36 Management Plan, which will be updated biennially, is to be developed through a public process
37 and in consultation with Federal agencies and stakeholders.
38
39

40 **7.4 Presidential and Executive Branch Policies**

41
42 President Clinton issued a memorandum to the heads of executive departments and
43 agencies regarding government-to-government relations with Tribal governments on April 29,
44 1994. This memorandum directed executive departments and agencies to implement activities
45 that affect Tribal rights in a "knowledgeable, sensitive manner respectful of tribal sovereignty."
46 The memorandum outlined principles for executive departments and agencies to follow in their
47 interactions with Tribal governments and clarify the responsibility of the Federal government to
48 operate within a government-to-government relationship with federally recognized American
49 Indian Tribes.
50

51 The U.S. Department of Justice recently reaffirmed a long-standing policy regarding the
52 relationship between the Federal government and American Indian Tribes (61 FR 29424). The
53 policy states that the United States recognizes the sovereign status of Indian Tribes as
54 "domestic dependent nations" from its earliest days. The Constitution recognizes Indian

1 sovereignty by classifying Indian treaties among the "supreme Law of the Land," and
2 establishes Indian affairs as a unique area of Federal concern.
3

4 The DOE American Indian policy commits DOE to working with Tribal governments on a
5 government-to-government basis, recognizes the Federal trust relationship with Tribes and
6 Tribal members' treaty rights, and commits the department to consultation with Tribes regarding
7 agency activities that could potentially affect the Tribes.
8
9

10 **7.5 U.S. Department of Energy Regulations, Orders, and Other** 11 **Agreements and Requirements**

12 This section identifies DOE regulations implementing statutory environmental, health,
13 and safety protection responsibilities and requirements that must be met by operating
14 contractors.
15
16

17 The DOE is responsible for establishing a comprehensive health, safety, and
18 environmental program for its facilities, as authorized by the *Atomic Energy Act of 1954* (AEA).
19 The regulatory mechanisms used by DOE to manage its facilities are the promulgation of
20 regulations and issuance of DOE orders.
21

22 DOE regulations are found in Title 10 of the CFR. These regulations address such
23 areas as energy conservation, administrative requirements and procedures, nuclear safety, and
24 classified information. For purposes of this EIS, relevant regulations include the following:
25

- 26 • 10 CFR 820, "Procedural Rules for U.S. Department of Energy Nuclear Activities"
- 27 • 10 CFR 830.120, "Quality Assurance Requirements"
- 28 • 10 CFR 834, "Radiation Protection of the Public and the Environment"
- 29 • 10 CFR 835, "Occupational Radiation Protection"
- 30 • 10 CFR 1021, "*National Environmental Policy Act* Implementing Procedures"
- 31 • 10 CFR 1022, "Compliance with Floodplain/Wetlands Environmental Review
32 Requirements."
33
34
35
36
37
38

39 The DOE orders generally set forth policies and identify the need for programs and
40 internal procedures to implement those policies.
41

42 The DOE, represented by the Bonneville Power Administration, entered into the *Vernita*
43 *Bar Settlement Agreement* with several Public Utility Districts, the National Marine Fisheries
44 Service, the States of Washington and Oregon, the Confederated Tribes of the Yakama Nation,
45 the CTUIR, and the Confederated Tribes of the Colville Indian Reservation in June 1988. The
46 Agreement established the obligation of the parties to protect mid Columbia summer/fall
47 Chinook Salmon run at Vernita Bar by requiring maintenance of a sufficient amount of water
48 flowing over Vernita Bar (protection-level flow) to provide protection to salmon redds. The
49 Agreement was approved by the Federal Energy Regulatory Commission as a condition of
50 license for the Priest Rapids Dam. Flows are to be maintained through the spawning period,
51 pre-hatch period, post-hatch period, and emergence period, from approximately December 15
52 through May 31 each year. The Agreement limits river flow in the fall to 1,960 cubic meters per
53 second (70,000 cubic feet per second), with post-spawning flows determined annually based on
54 field surveys that identify when, where, and to what extent spawning has occurred (NPS 1994).

1 Parties to the agreement may request reopening of the agreement and the imposition by the
2 Federal Energy Regulatory Commission of different, additional, or modified fall Chinook salmon
3 protection measures at Vernita Bar.
4

5 The Office of Management and Budget Circular A-95 provides guidance to Federal
6 agencies for cooperation with state and local agencies in the evaluation, review, and
7 coordination of Federal and federally assisted programs and projects.
8
9

10 **7.6 Consultations**

11
12 The NEPA and the Council on Environmental Quality (CEQ) regulations require
13 consultation with Federal, Tribal, state, and local agencies with jurisdiction or special expertise
14 regarding any environmental impact. Agencies involved include those with authority to issue
15 applicable permits, licenses, and other regulatory approvals; as well as those agencies
16 responsible for protecting significant resources (e.g., endangered species, critical habitats, or
17 historic resources). Federal and state agencies and Tribal governments have been, and will
18 continue to be, consulted during the development of the Final HCP EIS. Representatives of
19 Federal, Tribal, state, and local agencies were involved in scoping for the HRA-EIS through
20 involvement in the Hanford Future Site Uses Working Group and will be consulted in the
21 preparation of the Final HCP EIS. Copies of letters from DOE inviting the participation of
22 cooperating agencies and consulting Tribal governments are presented in Appendix B. Copies
23 of response letters received by DOE are also included.
24

25 **7.6.1 Consultation with Other Federal Agencies**

26
27 In accordance with CEQ guidance encouraging lead agencies to consult with other
28 agencies during the NEPA process, DOE invited other Federal agencies to participate in
29 scoping and development of the Final HCP EIS. The DOI (USFWS and the National Park
30 Service [NPS]) and the EPA were represented on the Hanford Future Site Uses Working Group
31 and assisted in developing the group's report (FSUWG 1992), which was adopted as a scoping
32 comment for the HRA-EIS. The emphasis of the HRA-EIS on future land use led to the
33 development of a comprehensive land-use plan for the Hanford Site, which was issued as
34 Appendix M to the August 1996 Draft HRA-EIS. Other Federal agencies were invited to
35 participate in a series of meetings geared to identify values associated with Hanford Site
36 resources. The DOI (USFWS, BLM, and the Bureau of Indian Affairs [BIA]), EPA, and
37 Department of Commerce (National Marine Fisheries Service) were invited to participate in
38 these meetings. Subsequent to identification of values, DOE developed a comprehensive land-
39 use plan that incorporated values identified by the participants in the meetings.
40

41 The DOE received numerous comments on the August 1996 Draft HRA-EIS that
42 emphasized the need for more extensive agency participation in land-use planning at the
43 Hanford Site and the need to consider alternatives to the single plan presented in the
44 Comprehensive Land-Use Plan. The DOI, in particular, requested formal involvement in the
45 land-use planning process for the Hanford Site. As a result of these comments, DOE cut the
46 scope of the HRA-EIS to emphasize future land use at the Hanford Site and formally invited
47 other Federal agencies to cooperate in preparation of the downsized Revised Draft and the
48 Final HCP EIS.
49

50 The DOE also initiated a series of meetings through which alternative land-use plans
51 were developed and analyzed. Representatives of the DOI (USFWS, BLM, and Bureau of
52 Reclamation [BoR]) have participated in these meetings and have assisted in the development
53 of the Final HCP EIS.
54

55 In addition to consultation on the land-use planning process, DOE has formally

1 requested updated lists of endangered species from the USFWS and the National Marine
2 Fisheries Service. The DOE has also requested that the BoR provide information regarding the
3 availability of water for potential development of irrigated agriculture on the Wahluke Slope.
4 The DOE also consulted with the Natural Resources Conservation Service (formerly known as
5 the Soil Conservation Service) regarding "prime and unique farmlands" on the Hanford Site
6 (Jason Associates 1996).

7 8 **7.6.2 Consultation with Affected Tribal Governments**

9
10 The policy of the Federal government for relations with Tribal governments is clearly
11 stated. The Department of Justice recently reaffirmed a long-standing policy regarding the
12 relationship between the Federal government and American Indian Tribes (61 FR 29424). The
13 policy emphasizes the Federal trust responsibility in government-to-government relations with
14 Indian Tribes. Furthermore, the policy of the present Presidential Administration recognizes the
15 sovereignty of Tribal governments, supports the Tribal Governments' rights of self-government
16 and self-determination, and to commit to government-to-government relationships with Tribal
17 governments. The official policy also emphasizes the responsibility of Federal agencies to
18 remove impediments to working directly with Tribal governments on activities that effect the
19 trust property and/or governmental rights of the Tribes. The DOE American Indian policy
20 commits DOE to working with American Indian Tribal governments on a government-to-
21 government basis, recognizes that some Tribes have treaty-protected interests in resources
22 outside reservation boundaries, recognizes the Federal trust relationship to American Indian
23 Tribes imposes duties on DOE, commits to consult with American Indian Tribal governments
24 concerning DOE activities that potentially affect Tribes, and commits to remove impediments to
25 working directly and effectively with Tribal governments in accordance with the Presidential
26 policy. Consultations with Tribal governments have been, and will continue to be, carried out in
27 accordance with these policies.

28
29 The DOE invited Tribal Governments to participate in the scoping of the August 1996
30 Draft HRA-EIS through the Hanford Future Site Uses Working Group, in development of the
31 Comprehensive Land-Use Plan through the meeting held by DOE to identify values associated
32 with Hanford Site resources, and in development of the Final HCP EIS as consulting Tribal
33 governments. Representatives of the CTUIR, Yakama Nation, and Nez Perce Tribe were
34 participants on the Working Group. The Wanapum Band, CTUIR, Yakama Nation, and Nez
35 Perce Tribe all participated in meetings on comprehensive land-use planning prior to issuance
36 of the August 1996 Draft HRA-EIS. Nevertheless, Tribal governments expressed concern that
37 the August 1996 Draft HRA-EIS presented only one alternative for land use at the Hanford Site
38 and indicated a desire to have a greater role in the planning process. As a result of these
39 concerns, and the concerns of other entities regarding land-use planning at the Hanford Site,
40 DOE invited the affected Tribes to participate in the land-use planning process.
41 Representatives of the CTUIR, Nez Perce Tribe, and Yakama Nation have been consulted with
42 in the process. The CTUIR and Nez Perce Tribe representatives have provided alternatives for
43 analysis in the Final HCP EIS.

44 45 **7.6.3 Consultation with State and Local Governments**

46
47 The DOE has invited state and local government agencies to participate in all phases of
48 the Final HCP EIS. State and local governments were invited, through their participation in the
49 Hanford Future Site Uses Working Group, to participate in the scoping of the August 1996 Draft
50 HRA-EIS. They participated in the development of the Comprehensive Land-Use Plan through
51 a meeting held by DOE to identify values associated with Hanford Site resources, and, as
52 cooperating agencies, they helped develop the Final HCP EIS. Representatives from the states
53 of Washington and Oregon; Benton, Franklin, and Grant counties; and the Port of Benton
54 participated on the Working Group. Representatives from Ecology and the Washington
55 Department of Fish and Wildlife; Benton, Adams, Franklin, and Grant County Commissioners'

1 offices; Benton County and City of Richland Planning Departments; and the Port of Benton
2 were invited to participate in meetings on comprehensive land-use planning prior to
3 development of the August 1996 Draft HRA-EIS. Upon issuance of the August 1996 Draft
4 HRA-EIS, these government entities expressed concern that the Comprehensive Land-Use
5 Plan presented only one alternative for land use at the Hanford Site. Several local agencies
6 expressed an interest in working with DOE in the planning process. As a result of these
7 concerns, and concerns of other entities regarding land-use planning at the Hanford Site, DOE
8 invited state and local governments to cooperate in development of this Final HCP EIS. |
9 Representatives of these entities have either participated in the planning process or been
10 consulted during the process of developing this Final HCP EIS. |

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2
3

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5

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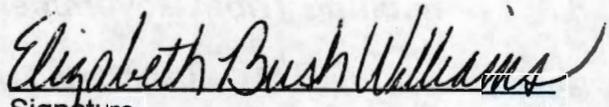
**JASON ASSOCIATES CORPORATION
NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
HANFORD COMPREHENSIVE LAND-USE PLAN ENVIRONMENTAL IMPACT STATEMENT
FOR THE U.S. DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE**

The Council on Environmental Quality Regulations, at 40 *Code of Federal Regulations* (CFR) 1506.5(c), which have been adopted by the U.S. Department of Energy (10 CFR 1021), require contractors who will prepare an Environmental Impact Statement to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* (FR) 18026-18038, at Questions 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work on the project, as well as indirect benefits the consultant is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients," 46 FR 18026-18038 at 18031.

In accordance with these requirements, Jason Associates Corporation hereby certifies that it has no financial or other interests in the outcome of the project.

Certified by:


Signature

Elizabeth Bush Williams, Project Manager
Name and Title

September 1999
Date

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Appendix A — Treaties

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Submitted by Kevin Fraley from public records Jan. 21, 1997.
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Blackfeet Treaty of Fort Benton, 1855

Articles of agreement and convention made and concluded at the council-ground on the Upper Missouri, near the mouth of the Judith River, in the Territory of Nebraska, this seventeenth day of October, in the year one thousand eight hundred and fifty-five, by and between A. Cumming and Isaac I. Stevens, commissioners duly appointed and authorized, on the part of the United States, and the undersigned chiefs, headmen, and delegates of the following nations and tribes of Indians, who occupy, for the purposes of hunting, the territory on the Upper Missouri and Yellowstone Rivers, and who have permanent homes as follows: East of the Rocky Mountains, the Blackfoot Nation, consisting of the Piegan, Blood, Blackfoot, and Gros Ventres tribes of Indians. West of the Rocky Mountains, the Flathead Nation, consisting of the Flathead, Upper Pend 'Oreille, and Kootenay tribes of Indians, and the Nez Perce tribe of Indians, the said chiefs, headmen and delegates, in behalf of and acting for said nations and tribes, and being duly authorized thereto by them.

ARTICLE 1. Peace, friendship and amity shall hereafter exist between the United States and the aforesaid nations and tribes of Indians, parties to this treaty, and the same shall be perpetual.

ARTICLE 2. The aforesaid nations and tribes of Indians, parties to this treaty, do hereby jointly and severally covenant that peaceful relations shall likewise be maintained among themselves in future; and that they will abstain from all hostilities whatsoever against each other, and cultivate mutual good-will and friendship. And the nations and tribes aforesaid do furthermore jointly and severally covenant, that peaceful relations shall be maintained with and that they will abstain from all hostilities whatsoever, excepting in self-defense, against the following-named nations and tribes of Indians, to wit: the Crows, Assineboins, Crees, Snakes, Blackfeet, Sans Arcs, and Auncepa-pas bands of Sioux, and all other neighboring nations and tribes of Indians.

ARTICLE 3. The Blackfoot Nation consent and agree that all that portion of the country recognized and defined by the treaty of Laramie as Blackfoot territory, lying within lines drawn from the Hell Gate or Medicine Rock Passes in the main range of the Rocky Mountains, in an easterly direction to the nearest source of the Muscle Shell River, thence to the mouth of Twenty-five Yard Creek, thence up the Yellowstone River to its northern source, and thence along the main range of the Rocky Mountains, in a northerly direction, to the point of beginning, shall be a common hunting-ground for ninety-nine years, where all the nations, tribes and bands of Indians, parties to this treaty, may enjoy equal and uninterrupted privileges of hunting, fishing and gathering fruit, grazing animals, curing meat and dressing robes. They further agree that they will not establish villages, or in any other way exercise exclusive rights within ten miles of the northern line of the common hunting-ground, and that the parties to this treaty may hunt on said northern boundary line and within ten miles thereof.

Provided, That the western Indians, parties to this treaty, may hunt on the trail leading down the

1 Muscle Shell to the Yellowstone; the Muscle Shell River being the boundary separating the
2 Blackfoot from the Crow territory.

3
4 And provided, That no nation, band, or tribe of Indians, parties to this treaty, nor any other
5 Indians, shall be permitted to establish permanent settlements, or in any other way exercise,
6 during the period above mentioned, exclusive rights or privileges within the limits of the
7 above-described hunting-ground.

8
9 And provided further, That the rights of the western Indians to a whole or a part of the common
10 hunting-ground, derived from occupancy and possession, shall not be affected by this article,
11 except so far as said rights may be determined by the treaty of Laramie.

12
13 **ARTICLE 4.** The parties to this treaty agree and consent, that the tract of country lying within
14 lines drawn from the Hell Gate or Medicine Rock Passes, in an easterly direction, to the nearest
15 source of the Muscle Shell River, thence down said river to its mouth, thence down the channel
16 of the Missouri River to the mouth of Milk River, thence due north to the forty-ninth parallel,
17 thence due west on said parallel to the main range of the Rocky Mountains, and thence
18 southerly along said range to the place of beginning, shall be the territory of the Blackfoot
19 Nation, over which said nation shall exercise exclusive control, excepting as may be otherwise
20 provided in this treaty. Subject, however, to the provisions of the third article of this treaty,
21 giving the right to hunt, and prohibiting the establishment of permanent villages and the
22 exercise of any exclusive rights within ten miles of the northern line of the common
23 hunting-ground, drawn from the nearest source of the Muscle Shell River to the Medicine Rock
24 Passes, for the period of ninety-nine years.

25
26 Provided also, That the Assiniboins shall have the right of hunting, in common with the
27 Blackfeet, in the country lying between the aforesaid eastern boundary line, running from the
28 mouth of Milk River to the forty-ninth parallel, and a line drawn from the left bank of the Missouri
29 River, opposite the Round Butte north, to the forty-ninth parallel.

30
31 **ARTICLE 5.** The parties to this treaty, residing west of the main range of the Rocky Mountains,
32 agree and consent that they will not enter the common hunting ground, nor any part of the
33 Blackfoot territory, or return home, by any pass in the main range of the Rocky Mountains to the
34 north of the Hell Gate or Medicine Rock Passes. And they further agree that they will not hunt
35 or otherwise disturb the game, when visiting the Blackfoot territory for trade or social
36 intercourse.

37
38 **ARTICLE 6.** The aforesaid nations and tribes of Indians, parties to this treaty, agree and
39 consent to remain within their own respective countries, except when going to or from, or whilst
40 hunting upon, the "common hunting ground," or when visiting each other for the purpose of
41 trade or social intercourse.

42
43 **ARTICLE 7.** The aforesaid nations and tribes of Indians agree that citizens of the United States
44 may live in and pass unmolested through the countries respectively occupied and claimed by
45 them. And the United States is hereby bound to protect said Indians against depredations and
46 other unlawful acts which white men residing in or passing through their country may commit.

47
48 **ARTICLE 8.** For the purpose of establishing traveling thoroughfares through their country, and
49 the better to enable the President to execute the provisions of this treaty, the aforesaid nations
50 and tribes do hereby consent and agree, that the United States may, within the countries
51 respectively occupied and claimed by them, construct roads of every description; establish lines
52 of telegraph and military posts; use materials of every description found in the Indian country;
53 build houses for agencies, missions, schools, farms, shops, mills, stations, and for any other
54 purpose for which they may be required, and permanently occupy as much land as may be
55 necessary for the various purposes above enumerated, including the use of wood for fuel and

1 land for grazing, and that the navigation of all lakes and streams shall be forever free to citizens
2 of the United States.

3
4 **ARTICLE 9.** In consideration of the foregoing agreements, stipulations, and cessions, and on
5 condition of their faithful observance, the United States agree to expend, annually, for the
6 Piegan, Blood, Blackfoot, and Gros Ventres tribes of Indians, constituting the Blackfoot Nation,
7 in addition to the goods and provisions distributed at the time of signing the treaty, twenty
8 thousand dollars, annually, for ten years, to be expended in such useful goods and provisions,
9 and other articles, as the President, at his discretion, may from time to time determine; and the
10 superintendent, or other proper officer, shall each year inform the President of the wishes of the
11 Indians in relation thereto: Provided, however, That if, in the judgment of the President and
12 Senate, this amount be deemed insufficient, it may be increased not to exceed the sum of
13 thirty-five thousand dollars per year.

14
15 **ARTICLE 10.** The United States further agree to expend annually, for the benefit of the
16 aforesaid tribes of the Blackfoot Nation, a sum not exceeding fifteen thousand dollars annually,
17 for ten years, in establishing and instructing them in agricultural and mechanical pursuits, and in
18 educating their children, and in any other respect promoting their civilization and
19 Christianization: Provided, however, That to accomplish the objects of this article, the
20 President may, at his discretion, apply any or all the annuities provided for in this treaty: And
21 provided, also, That the President may, at his discretion, determine in what proportions the said
22 annuities shall be divided among the several tribes.

23
24 **ARTICLE 11.** The aforesaid tribes acknowledge their dependence on the Government of the
25 United States, and promise to be friendly with all citizens thereof, and to commit no
26 depredations or other violence upon such citizens. And should any one or more violate this
27 pledge, and the fact be proved to the satisfaction of the President, the property taken shall be
28 returned, or, in default thereof, or if injured or destroyed, compensation may be made by the
29 Government out of the annuities. The aforesaid tribes are hereby bound to deliver such
30 offenders to the proper authorities for trial and punishment, and are held responsible, in their
31 tribal capacity, to make reparation for depredations so committed.

32
33 Nor will they make war upon any other tribes, except in self-defense, but will submit all matter of
34 difference, between themselves and other Indians, to the Government of the United States,
35 through its agents, for adjustment, and will abide thereby. And if any of the said Indians, parties
36 to this treaty, commit depredations on any other Indians within the jurisdiction of the United
37 States, the same rule shall prevail as that prescribed in this article in case of depredations
38 against citizens. And the said tribes agree not to shelter or conceal offenders against the laws
39 of the United States, but to deliver them up to the authorities for trial.

40
41 **ARTICLE 12.** It is agreed and understood, by and between the parties to this treaty, that if any
42 nation or tribe of Indians aforesaid, shall violate any of the agreements, obligations, or
43 stipulations, herein contained, the United States may withhold, for such length of time as the
44 President and Congress may determine, any portion or all of the annuities agreed to be paid to
45 said nation or tribe under the ninth and tenth articles of this treaty.

46
47 **ARTICLE 13.** The nations and tribes of Indians, parties to this treaty, desire to exclude from
48 their country the use of ardent spirits or other intoxicating liquor, and to prevent their people
49 from drinking the same. Therefore it is provided, that any Indian belonging to said tribes who is
50 guilty of bringing such liquor into the Indian country, or who drinks liquor, may have his or her
51 proportion of the annuities withheld from him or her, for such time as the President may
52 determine.

53
54 **ARTICLE 14.** The aforesaid nations and tribes of Indians, west of the Rocky Mountains, parties
55 to this treaty, do agree, in consideration of the provisions already made for them in existing

1 treaties, to accept the guarantees of the peaceful occupation of their hunting-grounds, east of
2 the Rocky Mountains, and of remuneration for depredations made by the other tribes, pledged
3 to be secured to them in this treaty out of the annuities of said tribes, in full compensation for
4 the concessions which they, in common with the said tribes, have made in this treaty.
5

6 The Indians east of the mountains, parties to this treaty, likewise recognize and accept the
7 guarantees of this treaty, in full compensation for the injuries or depredations which have been,
8 or may be committed by the aforesaid tribes, west of the Rocky Mountains.
9

10 **ARTICLE 15.** The annuities of the aforesaid tribes shall not be taken to pay the debts of
11 individuals.
12

13 **ARTICLE 16.** This treaty shall be obligatory upon the aforesaid nations and tribes of Indians,
14 parties hereto, from the date hereof, and upon the United States as soon as the same shall be
15 ratified by the President and Senate.
16

17 In testimony whereof the said A. Cumming and Isaac I. Stevens, commissioners on the part of
18 the United States, and the undersigned chiefs, headmen, and delegates of the aforesaid
19 nations and tribes of Indians, parties to this treaty, have hereunto set their hands and seals at
20 the place and on the day and year hereinbefore written.
21

22
23 A. Cumming. (L.S.)

Blods:

24
25 Isaac I. Stevens. (L.S.)

Onis-tay-say-nah-que-im, his x mark. (L.S.)

26
27 **Piegans:**

The Father of All Children, his x mark.
(L.S.)

28
29 Nee-ti-nee, or "the only chief," now called
30 the Lame Bull, his x mark. (L.S.)

The Bull's Back Fat, his x mark. (L.S.)

31
32 Mountain Chief, his x mark. (L.S.)

Heavy Shield, his x mark. (L.S.)

33
34 Low Horn, his x mark. (L.S.)

Nah-tose-onistah, his x mark. (L.S.)

35
36 Little Gray Head, his x mark. (L.S.)

The Calf Shirt, his x mark. (L.S.)

37
38 Little Dog, his x mark. (L.S.)

Gros Ventres:

39
40 Big Snake, his x mark. (L.S.)

Bear's Shirt, his x mark. (L.S.)

41
42 The Skunk, his x mark. (L.S.)

Little Soldier, his x mark. (L.S.)

43
44 The Bad Head, his x mark. (L.S.)

Star Robe, his x mark. (L.S.)

45
46 Kitch-ee-pone-istah, his x mark. (L.S.)

Sitting Squaw, his x mark. (L.S.)

47
48 Middle Sitter, his x mark. (L.S.)

Weasel Horse, his x mark. (L.S.)

The Rider, his x mark. (L.S.)

Eagle Chief, his x mark. (L.S.)

Heap of Bears, his x mark. (L.S.)

- 1 **Blackfeet:**
- 2
- 3 The Three Bulls, his x mark. (L.S.)
- 4
- 5 The Old Kootomais, his x mark. (L.S.)
- 6
- 7 Pow-ah-que, his x mark. (L.S.)
- 8
- 9 Chief Rabbit Runner, his x mark. (L.S.)
- 10
- 11 **Nez Perces:**
- 12
- 13 Spotted Eagle, his x mark. (L.S.)
- 14
- 15 Looking Glass, his x mark. (L.S.)
- 16
- 17 The Three Feathers, his x mark. (L.S.)
- 18
- 19 Eagle from the Light, his x mark. (L.S.)
- 20
- 21 The Lone Bird, his x mark. (L.S.)
- 22
- 23 Ip-shun-nee-wus, his x mark. (L.S.)
- 24
- 25 Jason, his x mark. (L.S.)
- 26
- 27 Wat-ti-wat-ti-we-hinck, his x mark. (L.S.)
- 28
- 29 White Bird, his x mark. (L.S.)
- 30
- 31 Stabbing Man, his x mark. (L.S.)
- 32
- 33 Jesse, his x mark. (L.S.)
- 34
- 35 Plenty Bears, his x mark. (L.S.)
- 36
- 37 **Flathead Nation:**
- 38
- 39 Victor, his x mark. (L.S.)
- 40
- 41 Alexander, his x mark. (L.S.)
- 42
- 43 Moses, his x mark. (L.S.)
- 44
- 45 Big Canoe, his x mark. (L.S.)
- 46
- 47 Ambrose, his x mark. (L.S.)
- 48
- 49 Kootle-cha, his x mark. (L.S.)
- 50
- 51 Michelle, his x mark. (L.S.)
- 52
- 53 Francis, his x mark. (L.S.)
- 54
- 55 Vincent, his x mark. (L.S.)

- Andrew, his x mark. (L.S.)
- Adolphe, his x mark. (L.S.)
- Thunder, his x mark. (L.S.)
- Piegans:**
- Running Rabbit, his x mark. (L.S.)
- Chief Bear, his x mark. (L.S.)
- The Little White Buffalo, his x mark. (L.S.)
- The Big Straw, his x mark. (L.S.)
- Flathead:**
- Bear Track, his x mark. (L.S.)
- Little Michelle, his x mark. (L.S.)
- Palchinah, his x mark. (L.S.)
- Bloods:**
- The Feather, his x mark. (L.S.)
- The White Eagle, his x mark. (L.S.)

1	Executed in presence of - -	
2		
3	James Doty, Secretary.	W. Craig, Nez Perce interpreters
4		
5	Alfred J. Vaughan, Jr.	Delaware Jim, his x mark, Nez Perce interpreters
6		
7	E. Alw. Hatch, agent for Blackfeet	Witness, James Doty, Nez Perce interpreters
8		
9	Thomas Adams, special agent Flathead Nation	A Cree Chief (Broken Arm,) his mark
10		
11		
12	R. H. Lansdale, Indian agent Flathead Nation	Witness, James Doty
13		
14		
15	W. H. Tappan, sub-agent for the Nez Perce	A. J. Hoeekeorsg
16		
17	James Bird, Blackfoot interpreters	James Croke
18		
19	A. Culbertson, Blackfoot interpreters	E. S. Wilson
20		
21	Benj. Deroche, Blackfoot interpreters	A. C. Jackson
22		
23	Benj. Kiser, his x mark, Flat Head interpreters	Charles Shucette, his x mark
24		
25		Christ. P. Higgins
26	Witness, James Doty, Flat Head interpreters	A. H. Robie
27		
28		
29	Gustavus Sohon, Flat Head interpreters	S. S. Ford, Jr.

30
31
32 Ratified Apr. 15, 1856.
33 Proclaimed Apr. 25, 1856.
34

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2 general public without fee or charge of any kind. It is intended that
3 this material not be used in a commercial manner.
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5 Submitted by Kevin Fraley from public records Feb. 17, 1997.
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10 *Nez Perce Treaty of Lapwai, 1863*

11
12
13
14 Articles of agreement made and concluded at the council-ground, in the valley of the Lapwai,
15 Washington Territory, on the ninth day of June, one thousand eight hundred and sixty-three,
16 between the United States of America, by C. H. Hale, superintendent of Indian affairs, and
17 Charles Hutchins and S. D. Howe, U.S. Indian agents for the Territory of Washington, acting on
18 the part and in behalf of the United States, and the Nez Perce Indians, by the chiefs, head-men,
19 and delegates of said tribe, such articles being supplementary and amendatory to the treaty
20 made between the United States and said tribe on the 11th day of June 1855.
21

22 **ARTICLE 1.** The said Nez Perce tribe agree to relinquish, and do hereby relinquish, to the
23 United States the lands heretofore reserved for the use and occupation of the said tribe, saving
24 and excepting so much thereof as is described in Article II for a new reservation.
25

26 **ARTICLE 2.** The United States agree to reserve for a home, and for the sole use and
27 occupation of said tribe, the tract of land included within the following boundaries, to wit:
28 Commencing at the northeast corner of Lake Wa-ha, and running thence, northerly, to a point
29 on the north bank of the Clearwater River, three miles below the mouth of the Lapwai, thence
30 down the north bank of the Clearwater to the mouth of the Hatwai Creek; thence, due north, to
31 a point seven miles distant; thence, eastwardly, to a point on the north fork of the Clearwater,
32 seven miles distant from its mouth; thence to a point on Oro Fino Creek, five miles above its
33 mouth; thence to a point on the north fork of the south fork of the Clearwater, five miles above
34 its mouth; thence to a point on the south fork of the Clearwater, one mile above the bridge, on
35 the road leading to Elk City, (so as to include all the Indian farms now within the forks;) thence
36 in a straight line, westwardly, to the place of beginning.
37

38 All of which tract shall be set apart, and the above-described boundaries shall be surveyed and
39 marked out for the exclusive use and benefit of said tribe as an Indian reservation, nor shall any
40 white man, excepting those in the employment of the Indian Department, be permitted to reside
41 upon the said reservation without permission of the tribe and the superintendent and agent; and
42 the said tribe agrees that so soon after the United States shall make the necessary provision for
43 fulfilling the stipulations of this instrument as they can conveniently arrange their affairs, and not
44 to exceed one year from its ratification, they will vacate the country hereby relinquished, and
45 remove to and settle upon the lands herein reserved for them, (except as may be hereinafter
46 provided.) In the meantime it shall be lawful for them to reside upon any ground now occupied
47 or under cultivation by said Indians at this time, and not included in the reservation above
48 named. And it is provided, that any substantial improvement heretofore made by any Indian,
49 such as fields enclosed and cultivated, or houses erected upon the lands hereby relinquished,
50 and which he may be compelled to abandon in consequence of this treaty, shall be valued
51 under the direction of the President of the United States, and payment therefore shall be made
52 in stock or in improvements of an equal value for said Indian upon the lot which may be
53 assigned to him within the bounds of the reservation, as he may choose, and no Indian will be
54 required to abandon the improvements aforesaid, now occupied by him, until said payment or
55 improvement shall have been made. And it is further provided, that if any Indian living on any of
56 the land hereby relinquished should prefer to sell his improvements to any white man, being a
57 loyal citizen of the United States, prior to the same being valued as aforesaid, he shall be

1 allowed so to do, but the sale or transfer of said improvements shall be made in the presence
2 of, and with the consent and approval of, the agent or superintendent, by whom a certificate of
3 sale shall be issued to the party purchasing, which shall set forth the amount of the
4 consideration in kind. Before the issue of said certificate, the agent or superintendent shall be
5 satisfied that a valuable consideration is paid, and that the party purchasing is of undoubted
6 loyalty to the United States Government. No settlement or claim made upon the improved
7 lands by any Indian will be permitted, except as herein provided, prior to the time specified for
8 their removal. Any sale or transfer thus made shall be in the stead of payment for
9 improvements from the United States.

10
11 **ARTICLE 3.** The President shall, immediately after the ratification of this treaty, cause the
12 boundary-lines to be surveyed, and properly marked and established; after which, so much of
13 the lands hereby reserved as may be suitable for cultivation shall be surveyed into lots of twenty
14 acres each, and every male person of the tribe who shall have attained the age of twenty-one
15 years, or is the head of a family, shall have the privilege of locating upon one lot as a
16 permanent home for such person, and the lands so surveyed shall be allotted under such rules
17 and regulations as the President shall prescribe, having such reference to their settlement as
18 may secure adjoining each other the location of the different families pertaining to each band,
19 so far as the same may be practicable. Such rules and regulations shall be prescribed by the
20 President, or under his direction, as will insure to the family, in case of the death of the head
21 thereof, the possession and enjoyment of such permanent home, and the improvements
22 thereon. When the assignments as above shall have been completed, certificates shall be
23 issued by the Commissioner of Indian Affairs, or under his direction, for the tracts assigned in
24 severalty, specifying the names of the individuals to whom they have been assigned
25 respectively, and that said tracts are set apart for the perpetual and exclusive use and benefit of
26 such assignees and their heirs. Until otherwise provided by law, such tracts shall be exempt
27 from levy, taxation, or sale, and shall be alienable in fee, or leased, or otherwise disposed of,
28 only to the United States, or to persons then being members of the Nez Perce tribe, and of
29 Indian blood, with the permission of the President, and under such regulations as the Secretary
30 of the Interior or the Commissioner of Indian Affairs shall prescribe; and if any such person or
31 family shall at any time neglect or refuse to occupy and till a portion of the land so assigned,
32 and on which they have located, or shall rove from place to place, the President may cancel the
33 assignment, and may also withhold from such person or family their proportion of the annuities
34 or other payments due them until they shall have returned to such permanent home, and
35 resumed the pursuits of industry; and in default of their return, the tract may be declared
36 abandoned, and thereafter assigned to some other person or family of such tribe. The residue
37 of the land hereby reserved shall be held in common for pasturage for the sole use and benefit
38 of the Indians: Provided, however, from time to time, as members of the tribe may come upon
39 the reservation, or may become of proper age, after the expiration of the time of one year after
40 the ratification of this treaty, as aforesaid, and claim the privileges granted under this article,
41 lots may be assigned from the lands thus held in common, wherever the same may be suitable
42 for cultivation. No State or territorial legislature shall remove the restriction herein provided for,
43 without the consent of Congress, and no State or territorial law to that end shall be deemed
44 valid until the same has been specially submitted to Congress for its approval.

45
46 **ARTICLE 4.** In consideration of the relinquishment herein made the United States agree to pay
47 to the said tribe, in addition to the annuities provided by the treaty of June 11, 1855, and the
48 goods and provisions distributed to them at the time of signing this treaty, the sum of two
49 hundred and sixty-two thousand and five hundred dollars, in manner following, to wit,

50
51 First. One hundred and fifty thousand dollars, to enable the Indians to remove and locate upon
52 the reservation, to be expended in the ploughing of land, and the fencing of the several lots,
53 which may be assigned to those individual members of the tribe who will accept the same in
54 accordance with the provisions of the preceding article, which said sum shall be divided into
55 four annual instalments, as follows: For the first year after the ratification of this treaty, seventy

1 thousand dollars; for the second year, forty thousand dollars; for the third year, twenty-five
2 thousand dollars; for the fourth year, fifteen thousand dollars.

3
4 Second. Fifty thousand dollars to be paid the first year after the ratification of this treaty in
5 agricultural implements, to include wagons or carts, harness, and cattle, sheep, or other stock,
6 as may be deemed most beneficial by the superintendent of Indian affairs, or agent, after
7 ascertaining the wishes of the Indians in relation thereto.

8
9 Third. Ten thousand dollars for the erection of a saw and flouring mill, to be located at Kamia,
10 the same to be erected within one year after the ratification hereof.

11
12 Fourth. Fifty thousand dollars for the boarding and clothing of the children who shall attend the
13 schools, in accordance with such rules or regulations as the Commissioner of Indian Affairs
14 may prescribe, providing the schools and boarding-houses with necessary furniture, the
15 purchase of necessary wagons, teams, agricultural implements, tools, etc., for their use, and for
16 the fencing of such lands as may be needed for gardening and farming purposes, for the use
17 and benefit of the schools, to be expended as follows: The first year after the ratification of this
18 treaty, six thousand dollars; for the next fourteen years, three thousand dollars each year; and
19 for the succeeding year, being the sixteenth and last instalment, two thousand dollars.

20
21 Fifth. A further sum of two thousand five hundred dollars shall be paid within one year after the
22 ratification hereof, to enable the Indians to build two churches, one of which is to be located at
23 some suitable point on the Kamia, and the other on the Lapwai.

24
25 **ARTICLE 5.** The United States further agree, that in addition to a head chief the tribe shall
26 elect two subordinate chiefs, who shall assist him in the performance of his public services, and
27 each subordinate chief shall have the same amount of land ploughed and fenced, with
28 comfortable house and necessary furniture, and to whom the same salary shall be paid as is
29 already provided for the head chief in Article 5 of the treaty of June 11, 1855, the salary to be
30 paid and the houses and land to be occupied during the same period and under like restrictions
31 as therein mentioned.

32
33 And for the purpose of enabling the agent to erect said buildings, and to plough and fence the
34 land, as well as to procure the necessary furniture, and to complete and furnish the house of
35 the head chief, as heretofore provided, there shall be appropriated, to be expended within the
36 first year after the ratification hereof, the sum of two thousand five hundred dollars.

37
38 And inasmuch-as several of the provisions of said art. 5th of the treaty of June 11, 1855,
39 pertaining to the erection of school-houses, hospital, shops, necessary buildings for employees
40 and for the agency, as well as providing the same with necessary furniture, tools, etc., have not
41 yet been complied with, it is hereby stipulated that there shall be appropriated, to be expended
42 for the purposes herein specified during the first year after the ratification hereof, the following
43 sums, to wit:

44
45 First. Ten thousand dollars for the erection of the two schools, including boarding-houses and
46 the necessary out-buildings; said schools to be conducted on the manual-labor system as far as
47 practicable.

48
49 Second. Twelve hundred dollars for the erection of the hospital, and providing the necessary
50 furniture for the same.

51
52 Third. Two thousand dollars for the erection of a blacksmith's shop, to be located at Kamia, to
53 aid in the completion of the smith's shop at the agency, and to purchase the necessary tools,
54 iron, steel, etc.; and to keep the same in repair and properly stocked with necessary tools and
55 materials, there shall be appropriated thereafter, for the fifteen years next succeeding, the sum

1 of five hundred dollars each year.

2
3 Fourth. Three thousand dollars for erection of houses for employees, repairs of mills, shops,
4 etc., and providing necessary furniture, tools, and materials. For the same purpose, and to
5 procure from year to year the necessary articles - - that is to say, saw-logs, nails, glass,
6 hardware, etc. - - there shall be appropriated thereafter, for the twelve years next succeeding,
7 the sum of two thousand dollars each year; and for the next three years, one thousand dollars
8 each year.

9
10 And it is further agreed that the United States shall employ, in addition to those already
11 mentioned in art. 5th of the treaty of June 11, 1855, two matrons to take charge of the
12 boarding-schools, two assistant teachers, one farmer, one carpenter, and two millers.

13
14 All the expenditures and expenses contemplated in this treaty, and not otherwise provided for,
15 shall be defrayed by the United States.

16
17 **ARTICLE 6.** In consideration of the past services and faithfulness of the Indian chief, Timothy,
18 it is agreed that the United States shall appropriate the sum of six hundred dollars, to aid him in
19 the erection of a house upon the lot of land which may be assigned to him, in accordance with
20 the provisions of the third article of this treaty.

21
22 **ARTICLE 7.** The United States further agree that the claims of certain members of the Nez
23 Perce tribe against the Government for services rendered and for horses furnished by them to
24 the Oregon mounted volunteers, as appears by certificate issued by W. H. Fauntleroy, A. R. Qr.
25 M. and Com. Oregon volunteers, on the 6th of March, 1856, at Camp Cornelius, and amounting
26 to the sum of four thousand six hundred and sixty-five dollars, shall be paid to them in full, in
27 gold coin.

28
29 **ARTICLE 8.** It is also understood that the aforesaid tribe do hereby renew their
30 acknowledgments of dependence upon the Government of the United States, their promises of
31 friendship, and other pledges, as set forth in the eighth article of the treaty of June 11, 1855;
32 and further, that all the provisions of said treaty which are not abrogated or specifically changed
33 by any article herein contained, shall remain the same to all intents and purposes as formerly, --
34 the same obligations resting upon the United States, the same privileges continued to the
35 Indians outside of the reservation, and the same rights secured to citizens of the U.S. as to right
36 of way upon the streams and over the roads which may run through said reservation, as are
37 therein set forth.

38
39 But it is further provided, that the United States is the only competent authority to declare and
40 establish such necessary roads and highways, and that no other right is intended to be hereby
41 granted to citizens of the United States than the right of way upon or over such roads as may
42 thus be legally established. Provided, however, that the roads now usually travelled shall, in the
43 mean time, be taken and deemed as within the meaning of this article, until otherwise enacted
44 by act of Congress or by the authority of the Indian Department.

45
46 And the said tribe hereby consent, that upon the public roads which may run across the
47 reservation there may be established, at such points as shall be necessary for public
48 convenience, hotels, or stage-stands, of the number and necessity of which the agent or
49 superintendent shall be the sole judge, who shall be competent to license the same, with the
50 privilege of using such amount of land for pasturage and other purposes connected with such
51 establishment as the agent or superintendent shall deem necessary, it being understood that
52 such lands for pasturage are to be enclosed, and the boundaries thereof described in the
53 license.

54
55 And it is further understood and agreed that all ferries and bridges within the reservation shall

1 be held and managed for the benefit of said tribe.

2
3 Such rules and regulations shall be made by the Commissioner of Indian Affairs, with the
4 approval of the Secretary of the Interior, as shall regulate the travel on the highways, the
5 management of the ferries and bridges, the licensing of public houses, and the leasing of lands,
6 as herein provided, so that the rents, profits, and issues thereof shall inure to the benefit of said
7 tribe, and so that the persons thus licensed, or necessarily employed in any of the above
8 relations, shall be subject to the control of the Indian Department, and to the provisions of the
9 act of Congress "to regulate trade and intercourse with the Indian tribes, and to preserve peace
10 on the frontiers."

11
12 All timber within the bounds of the reservation is exclusively the property of the tribe, excepting
13 that the U.S. Government shall be permitted to use thereof for any purpose connected with its
14 affairs, either in carrying out any of the provisions of this treaty, or in the maintaining of its
15 necessary forts or garrisons.

16
17 The United States also agree to reserve all springs or fountains not adjacent to, or directly
18 connected with, the streams or rivers within the lands hereby relinquished, and to keep back
19 from settlement or entry so much of the surrounding land as may be necessary to prevent the
20 said springs or fountains being enclosed; and, further, to preserve a perpetual right of way to
21 and from the same, as watering places, for the use in common of both whites and Indians.

22
23 **ARTICLE 9.** Inasmuch as the Indians in council have expressed their desire that Robert Newell
24 should have confirmed to him a piece of land lying between Snake and Clearwater Rivers, the
25 same having been given to him on the 9th day of June, 1861, and described in an instrument of
26 writing bearing that date, and signed by several chiefs of the tribe, it is hereby agreed that the
27 said Robert Newell shall receive from the United States a patent for the said tract of land.

28
29 **ARTICLE 10.** This treaty shall be obligatory upon the contracting parties as soon as the same
30 shall be ratified by the President and Senate of the United States.

31
32 In testimony whereof the said C. H. Hale, superintendent of Indian affairs, and Charles Hutchins
33 and S. D. Howe, United States Indian agents in the Territory of Washington, and the chiefs,
34 headmen, and delegates of the aforesaid Nez Perce tribe of Indians, have hereunto set their
35 hands and seals at the place and on the day and year hereinbefore written.

36		
37	Calvin H. Hale, Superintendent Indian	Timothy, x (SEAL.)
38	Affairs, Wash. T. (SEAL.)	
39		Levi, x (SEAL.)
40	Chas. Hutchins, United States Indian agent,	
41	Wash. T. (SEAL.)	Jason, x (SEAL.)
42		
43	S. D. Howe, United States Indian agent,	Ip-she-ne-wish-kin, (Capt. John,) x (SEAL.)
44	Wash. t. (SEAL.)	
45		Weptas-jump-ki, x (SEAL.)
46	Fa-Ind-7-1803 Lawyer	
47	Head Chief Nez Perce Nation. (SEAL.)	We-as-cus, x (SEAL.)
48		
49	Ute-sin-male-e-cum, x (SEAL.)	Pep-hoom-kan, (Noah,) x (SEAL.)
50		
51	Ha-harch-tuesta, x (SEAL.)	Shin-ma-sha-ho-soot, x (SEAL.)
52		
53	Tip-ulania-timecca, x (SEAL.)	Nie-ki-lil-meh-hoom, (Jacob,) x (SEAL.)
54		
55	Es-coatum, x (SEAL.)	Stoop-toop-nin, x (SEAL.)

1	Su-we-cus, x (SEAL.)	Sah-kan-tai, (Eagle,) x (SEAL.)
2		
3	Wal-la-ta-ma-na, x (SEAL.)	We-ah-se-nat, x (SEAL.)
4		
5	He-kaikt-il-pilp, x (SEAL.)	Hin-mia-tun-pin, x (SEAL.)
6		
7	Whis-tas-ket, x (SEAL.)	Ma-hi-a-kim, x (SEAL.)
8		
9	Neus-ne-keun, x (SEAL.)	Shock-lo-turn-wa-haikt, (Jo-nah,) x (SEAL.)
10		
11	Kul-lou-o-haikt, x (SEAL.)	Kunness-tak-mal, x (SEAL.)
12		
13	Wow-en-am-ash-il-pilp, x (SEAL.)	Tu-lat-sy-wat-kin, x (SEAL.)
14		
15	Kan-pow-e-een, x (SEAL.)	Tuck-e-tu-et-as, x (SEAL.)
16		
17	Watai-watai-wa-haikt, x (SEAL.)	Nic-a-las-in, x (SEAL.)
18		
19	Kup-kup-pellia, x (SEAL.)	Was-atis-il-pilp, x (SEAL.)
20		
21	Wap-tas-ta-mana, x (SEAL.)	Wow-es-en-at-im, x (SEAL.)
22		
23	Peo-peo-ip-se-wat, x (SEAL.)	Hiram, x (SEAL.)
24		
25	Louis-in-ha-cush-nim, x (SEAL.)	Howlish-wampum, x (SEAL.)
26		
27	Lam-lim-si-lilp-nim, x (SEAL.)	Wat-ska-leeks, x (SEAL.)
28		
29	Tu-ki-lai-kish, x (SEAL.)	Wa-lai-tus, x (SEAL.)
		Ky-e-wee-pus, x (SEAL.)
		Ko-ko-il-pilp, x (SEAL.)
		Reuben, Tip-ia-la-na-uy-kala-tsekin, x (SEAL.)
		Wish-la-na-ka-nin, x (SEAL.)
		Me-tat-ueptas, (Three Feathers,) x (SEAL.)
		Ray-kay-mass, x (SEAL.)

30 ***Signed and sealed in presence of - -***
31
32 George F. Whitworth, Secretary
33 Justus Steinberger, Colonel U.S. Volunteers
34
35 R. F. Malloy, Colonel Cavalry, O.V.
36
37 J. S. Rinearson, Major First Cavalry Oregon
38 Volunteers
39
40

William Kapus, First Lieutenant and
Adjutant First W. T. Infantry U.S. Volunteers
Harrison Olmstead
Jno. Owen, (Bitter Root.)
James O'Neil

1 J. B. Buker, M. D.

George W. Elber

A. A. Spalding, assistant interpreter

Perrin B. Whitman, interpreter for the
council

2 Ratified Apr. 17, 1867

3 Proclaimed Apr. 20, 1867

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2 general public without fee or charge of any kind. It is intended that
3 this material not be used in a commercial manner.
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10 *Third Nez Perce Treaty, 1868*

11
12
13
14 Whereas certain amendments are desired by the Nez Perce tribe of Indians to their treaty
15 concluded at the council ground in the valley of the Lapwai, in the Territory of Washington, on
16 the ninth day of June, in the year of our Lord one thousand eight hundred and sixty-three; and
17 whereas the United States are willing to assent to said amendments; it is therefore agreed by
18 and between Nathaniel G. Taylor, commissioner, on the part of the United States, thereunto
19 duly authorized, and Lawyer, Timothy, and Jason, chiefs of said tribe, also being thereunto duly
20 authorized, in manner and form following, that is to say:
21

22 **ARTICLE 1.** That all lands embraced within the limits of the tract set apart for the exclusive use
23 and benefit of said Indians by the 2d article of said treaty of June 9th, 1863, which are
24 susceptible of cultivation and suitable for Indian farms, which are not now occupied by the
25 United States for military purposes, or which are not required for agency or other buildings and
26 purposes provided for by existing treaty stipulations, shall be surveyed as provided in the 3d
27 article of said treaty of June 9th, 1863, and as soon as the allotments shall be plowed and
28 fenced, and as soon as schools shall be established as provided by existing treaty stipulations,
29 such Indians now residing outside the reservation as may be decided upon by the agent of the
30 tribe and the Indians themselves, shall be removed to and located upon allotments within the
31 reservation.
32

33 Provided, however, That in case there should not be a sufficient quantity of suitable land within
34 the boundaries of the reservation to provide allotments for those now there and those residing
35 outside the boundaries of the same, then those residing outside, or as many thereof as
36 allotments cannot be provided for, may remain upon the lands now occupied and improved by
37 them, provided, that the land so occupied does not exceed twenty acres for each and every
38 male person who shall have attained the age of twenty-one years or is the head of a family, and
39 the tenure of those remaining upon lands outside the reservation shall be the same as is
40 provided in said 3d article of said treaty of June 9th, 1863, for those receiving allotments within
41 the reservation; and it is further agreed that those now residing outside of the boundaries of the
42 reservation and who may continue to so reside shall be protected by the military authorities in
43 their rights upon the allotments occupied by them, and also in the privilege of grazing their
44 animals upon surrounding unoccupied lands.
45

46 **ARTICLE 2.** It is further agreed between the parties hereto that the stipulations contained in
47 the 8th article of the treaty of June 9th, 1863, relative to timber, are hereby annulled as far as
48 the same provides that the United States shall be permitted to use thereof in the maintaining of
49 forts or garrisons, and that the said Indians shall have the aid of the military authorities to
50 protect the timber upon their reservation, and that none of the same shall be cut or removed
51 without the consent of the head-chief of the tribe, together with the consent of the agent and
52 superintendent of Indian affairs, first being given in writing, which written consent shall state the
53 part of the reservation upon which the timber is to be cut, and also the quantity, and the price to
54 be paid therefore.
55

56 **ARTICLE 3.** It is further hereby stipulated and agreed that the amount due said tribe for school
57 purposes and for the support of teachers that has not been expended for that purpose since the

1 year 1864, but has been used for other purposes, shall be ascertained and the same shall be
2 reimbursed to said tribe by appropriation by Congress, and shall be set apart and invested in
3 United States bonds and shall be held in trust by the United States, the interest on the same to
4 be paid to said tribe annually for the support of teachers.
5

6 In testimony whereof the said Commissioner on the part of the United States and the said
7 chiefs representing said Nez Perce tribe of Indians have hereunto set their hands and seals this
8 13th day of August, in the year of our Lord one thousand eight hundred and sixty-eight, at the
9 city of Washington, D.C.

10 N. G. Taylor, (L.S.) Commissioner Indian Affairs. Lawyer, Head Chief Nez Perces. (L.S.)

11 Timothy, his x mark, Chief. (L.S.)

12
13 Jason, his x mark, Chief. (L.S.)

14
15
16
17 ***In presence of - -***

18 Charles E. Mix

19
20 Robert Newell, United States Agent

21
22 W. R. Irwin

23
24
25
26
27 Ratified Feb. 16, 1869

28 Proclaimed Feb. 24, 1869
29
30

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2 general public without fee or charge of any kind. It is intended that
3 this material not be used in a commercial manner.
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10
11 ***The Nez Perce Treaty, 1855***
12
13

14 Articles of agreement and convention made and concluded at the treaty ground, Camp
15 Stevens, in the Walla-Walla Valley, this eleventh day of June, in the year one thousand eight
16 hundred and fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian
17 affairs for the Territory of Washington, and Joel Palmer, superintendent of Indian affairs for
18 Oregon Territory, on the part of the United States, and the undersigned chiefs, head-men, and
19 delegates of the Nez Perce tribe of Indians occupying lands lying partly in Oregon and partly in
20 Washington Territories, between the Cascade and Bitter Root Mountains, on behalf of, and
21 acting for said tribe, and being duly authorized thereto by them, it being understood that
22 Superintendent Isaac I. Stevens assumes to treat only with those of the above-named tribe of
23 Indians residing within the Territory of Washington, and Superintendent Palmer with those
24 residing exclusively in Oregon Territory.
25

26 **ARTICLE 1.** The said Nez Perce tribe of Indians hereby cede, relinquish and convey to the
27 United States all their right, title, and interest in and to the country occupied or claimed by them,
28 bounded and described as follows, to wit: Commencing at the source of the Wo-na-ne-she or
29 southern tributary of the Palouse River; thence down that river to the main Palouse; thence in a
30 southerly direction to the Snake River, at the mouth of the Tucanon River; thence up the
31 Tucanon to its source in the Blue Mountains; thence southerly along the ridge of the Blue
32 Mountains; thence to a point on Grand Ronde River, midway between Grand Ronde and the
33 mouth of the Woll-low-how River; thence along the divide between the waters of the
34 Woll-low-how and Powder River; thence to the crossing of Snake River, at the mouth of Powder
35 River; thence to the Salmon River, fifty miles above the place known (as) the "crossing of the
36 Salmon River;" thence due north to the summit of the Bitter Root Mountains; thence along the
37 crest of the Bitter Root Mountains to the place of beginning.
38

39 **ARTICLE 2.** There is, however, reserved from the lands above ceded for the use and
40 occupation of the said tribe, and as a general reservation for other friendly tribes and bands of
41 Indians in Washington Territory, not to exceed the present numbers of the Spokane,
42 Walla-Walla, Cayuse, and Umatilla tribes and bands of Indians, the tract of land included within
43 the following boundaries, to wit: Commencing where the Moh-ha-na-she or southern tributary
44 of the Palouse River flows from the spurs of the Bitter Root Mountains; thence down said
45 tributary to the mouth of the Ti-nat-pan-up Creek; thence southerly to the crossing of the Snake
46 River ten miles below the mouth of the Al-po-wa-wi River; thence to the source of the
47 Al-po-wa-wi River in the Blue Mountains; thence along the crest of the Blue Mountains; thence
48 to the crossing of the Grand Ronde River, midway between the Grand Ronde and the mouth of
49 the Woll-low-how River; thence along the divide between the waters of the Woll-low-how and
50 Powder Rivers; thence to the crossing of the Snake River fifteen miles below the mouth of the
51 Powder River; thence to the Salmon River above the crossing; thence by the spurs of the Bitter
52 Root Mountains to the place of beginning.
53

54 All which tract shall be set apart, and, so far as necessary, surveyed and marked out for the
55 exclusive use and benefit of said tribe as an Indian reservation; nor shall any white man,
56 excepting those in the employment of the Indian Department, be permitted to reside upon the
57 said reservation without permission of the tribe and the superintendent and agent; and the said

1 tribe agrees to remove to and settle upon the same within one year after the ratification of this
2 treaty. In the mean time it shall be lawful for them to reside upon any ground not in the actual
3 claim and occupation of citizens of the United States, and upon any ground claimed or
4 occupied, if with the permission of the owner or claimant, guarantying, however, the right to all
5 citizens of the United States to enter upon and occupy as settlers any lands not actually
6 occupied and cultivated by said Indians at this time, and not included in the reservation above
7 named. And provided that any substantial improvement heretofore made by any Indian, such
8 as fields enclosed and cultivated, and houses erected upon the lands hereby ceded, and which
9 he may be compelled to abandon in consequence of this treaty, shall be valued under the
10 direction of the President of the United States, and payment made therefor in money, or
11 improvements of an equal value be made for said Indian upon the reservation, and no Indian
12 will be required to abandon the improvements aforesaid, now occupied by him, until their value
13 in money or improvements of equal value shall be furnished him as aforesaid.

14
15 **ARTICLE 3.** And provided that, if necessary for the public convenience, roads may be run
16 through the said reservation, and, on the other hand, the right of way, with free access from the
17 same to the nearest public highway, is secured to them, as also the right, in common with
18 citizens of the United States, to travel upon all public highways. The use of the Clear Water
19 and other streams flowing through the reservation is also secured to citizens of the United
20 States for rafting purposes, and as public highways.

21
22 The exclusive right of taking fish in all the streams where running through or bordering said
23 reservation is further secured to said Indians; as also the right of taking fish at all usual and
24 accustomed places in common with citizens of the Territory; and of erecting temporary buildings
25 for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their
26 horses and cattle upon open and unclaimed land.

27
28 **ARTICLE 4.** In consideration of the above cession, the United States agree to pay to the said
29 tribe in addition to the goods and provisions distributed to them at the time of signing this treaty,
30 the sum of two hundred thousand dollars, in the following manner, that is to say, sixty thousand
31 dollars, to be expended under the direction of the President of the United States, the first year
32 after the ratification of this treaty, in providing for their removal to the reserve, breaking up and
33 fencing farms, building houses, supplying them with provisions and a suitable outfit, and for
34 such other objects as he may deem necessary, and the remainder in annuities, as follows: for
35 the first five years after the ratification of this treaty, ten thousand dollars each year,
36 commencing September 1, 1856; for the next five years, eight thousand dollars each year; for
37 the next five years, six thousand each year, and for the next five years, four thousand dollars
38 each year. All which said sums of money shall be applied to the use and benefit of the said
39 Indians, under the direction of the President of the United States, who may from time to time
40 determine, at his discretion, upon what beneficial objects to expend the same for them. And
41 the superintendent of Indian affairs, or other proper officer, shall each year inform the President
42 of the wishes of the Indians in relation thereto.

43
44 **ARTICLE 5.** The United States further agree to establish, at suitable points within said
45 reservation, within one year after the ratification hereof, two schools, erecting the necessary
46 buildings, keeping the same in repair, and providing them with furniture, books, and stationery,
47 one of which shall be an agricultural and industrial school, to be located at the agency, and to
48 be free to the children of said tribe, and to employ one superintendent of teaching and two
49 teachers; to build two blacksmiths' shops, to one of which shall be attached a tinshop and to the
50 other a gunsmith's shop; one carpenter's shop, one wagon and plough maker's shop, and to
51 keep the same in repair, and furnished with the necessary tools to employ one superintendent
52 of farming and two farmers, two blacksmiths, one tinner, one gunsmith, one carpenter, one
53 wagon and plough maker, for the instruction of the Indians in trades, and to assist them in the
54 same; to erect one saw-mill and one flouring-mill, keeping the same in repair, and furnished
55 with the necessary tools and fixtures, and to employ two millers; to erect a hospital, keeping the

1 same in repair, and provided with the necessary medicines and furniture, and to employ a
2 physician; and to erect, keep in repair, and provide with the necessary furniture the buildings
3 required for the accommodation of the said employees. The said buildings and establishments
4 to be maintained and kept in repair as aforesaid, and the employees to be kept in service for
5 the period of twenty years.
6

7 And in view of the fact that the head chief of the tribe is expected, and will be called upon, to
8 perform many services of a public character, occupying much of his time, the United States
9 further agrees to pay to the Nez Perce tribe five hundred dollars per year for the term of twenty
10 years, after the ratification hereof, as a salary for such person as the tribe may select to be its
11 head chief. To build for him, at a suitable point on the reservation, a comfortable house, and
12 properly furnish the same, and to plough and fence for his use ten acres of land. The said
13 salary to be paid to, and the said house to be occupied by, such head chief so long as he may
14 be elected to that position by his tribe, and no longer. And all the expenditures and expenses
15 contemplated in this fifth article of this treaty shall be defrayed by the United States, and shall
16 not be deducted from the annuities agreed to be paid to said tribe, nor shall the cost of
17 transporting the goods for the annuity-payments be a charge upon the annuities, but shall be
18 defrayed by the United States.
19

20 **ARTICLE 7.** The President may from time to time, at his discretion, cause the whole, or such
21 portions of such reservation as he may think proper, to be surveyed into lots, and assign the
22 same to such individuals or families of the said tribe as are willing to avail themselves of the
23 privilege, and will locate on the same as a permanent home, on the same terms and subject to
24 the same regulations as are provided in the sixth article of the treaty with the Omahas in the
25 year 1854, so far as the same may be applicable.
26

27 **ARTICLE 8.** The annuities of the aforesaid tribe shall not be taken to pay the debts of
28 individuals.
29

30 **ARTICLE 9.** The aforesaid tribe acknowledge their dependence upon the Government of the
31 United States, and promise to be friendly with all citizens thereof, and pledge themselves to
32 commit no depredations on the property of such citizens; and should any one or more of them
33 violate this pledge, and the fact be satisfactorily proved before the agent, the property taken
34 shall be returned, or in default thereof, or if injured or destroyed, compensation may be made
35 by the Government out of the annuities. Nor will they make war on any other tribe except in
36 self-defense, but will submit all matters of difference between them and the other Indians to the
37 Government of the United States, or its agent, for decision, and abide thereby; and if any of the
38 said Indians commit any depredations on any other Indians within the Territory of Washington,
39 the same rule shall prevail as that prescribed in this article in cases of depredations against
40 citizens. And the said tribe agrees not to shelter or conceal offenders against the laws of the
41 United States, but to deliver them up to the authorities for trial.
42

43 **ARTICLE 10.** The Nez Perce desire to exclude from their reservation the use of ardent spirits,
44 and to prevent their people from drinking the same; and therefore it is provided that any Indian
45 belonging to said tribe who is guilty of bringing liquor into said reservation, or who drinks liquor,
46 may have his or her proportion of the annuities withheld from him or her for such time as the
47 President may determine.
48

49 **ARTICLE 11.** The Nez Perce Indians having expressed in council a desire that William Craig
50 should continue to live with them, he having uniformly shown himself their friend, it is further
51 agreed that the tract of land now occupied by him, and described in his notice to the register
52 and receiver of the land-office of the Territory of Washington, on the fourth day of June last,
53 shall not be considered a part of the reservation provided for in this treaty, except that it shall be
54 subject in common with the lands of the reservation to the operations of the intercourse act.
55

1 **ARTICLE 12.** This treaty shall be obligatory upon the contracting parties as soon as the same
2 shall be ratified by the President and Senate of the United States.
3

4 In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs
5 for the Territory of Washington, and Joel Palmer, superintendent of Indian affairs for Oregon
6 Territory, and the chiefs, headmen, and delegates of the aforesaid Nez Perce tribe of Indians,
7 have hereunto set their hands and seals, at the place, and on the day and year hereinbefore
8 written.
9

10 Isaac I. Stevens, (L.S.), Governor and 11 Superintendent Washington Territory.	Hah-hah-stoore-tee, his x mark. (L.S.)
12	Eee-maht-sin-pooh, his x mark. (L.S.)
13 Joel Palmer, (L.S.), Superintendent Indian 14 Affairs.	Tow-wish-au-il-pilp, his x mark. (L.S.)
15	
16 Aleiya, or Lawyer, Head-chief of the Nez 17 Perce, (L.S.)	Kay-kay-mass, his x mark. (L.S.)
18	Speaking Eagle, his x mark. (L.S.)
19 Appushwa-hite, or Looking-glass, his x 20 mark. (L.S.)	Wat-ti-wat-ti-wah-hi, his x mark. (L.S.)
21	
22 Joseph, his x mark. (L.S.)	Howh-no-tah-kun, his x mark. (L.S.)
23	
24 James, his x mark. (L.S.)	Tow-wish-wane, his x mark. (L.S.)
25	
26 Red Wolf, his x mark. (L.S.)	Wahpt-tah-shooshe, his x mark. (L.S.)
27	
28 Timothy, his x mark. (L.S.)	Bead Necklace, his x mark. (L.S.)
29	
30 U-ute-sin-male-cun, his x mark, (L.S.)	Koos-koos-tas-kut, his x mark. (L.S.)
31	
32 Spotted Eage, his x mark. (L.S.)	Levi, his x mark. (L.S.)
33	
34 Stoop-toop-nin, or Cut-hair, his x mark. 35 (L.S.)	Pee-oo-pe-whi-hi, his x mark. (L.S.)
36	Pee-oo-pee-iecteim, his x mark. (L.S.)
37 Tah-moh-moh-kin, his x mark. (L.S.)	Pee-poome-kah, his x mark. (L.S.)
38	Hah-hah-stilil-at-me, his x mark. (L.S.)
39 Tippelanecbupooh, his x mark. (L.S.)	Wee-yoke-sin-ate, his x mark. (L.S.)
40	Wee-ah-ki, his x mark. (L.S.)
41 Hah-hah-stilpilp, his x mark. (L.S.)	Necalahtsin, his x mark. (L.S.)
42	Suck-on-tie, his x mark. (L.S.)
43 Cool-cool-shua-nin, his x mark. (L.S.)	Ip-nat-tam-moose, his x mark. (L.S.)
44	Jason, his x mark. (L.S.)
45 Silish, his x mark. (L.S.)	Kole-kole-til-ky, his x mark. (L.S.)
46	
47 Toh-toh-molewit, his x mark. (L.S.)	
48	
49 Tuky-in-lik-it, his x mark. (L.S.)	
50	
51 Te-hole-hole-soot, his x mark. (L.S.)	
52	
53 Ish-coh-tim, his x mark. (L.S.)	
54	
55 Wee-as-cus, his x mark. (L.S.)	

1 In-mat-tute-kah-ky, his x mark. (L.S.)
2
3 Moh-see-chee, his x mark. (L.S.)
4
5 George, his x mark. (L.S.)
6
7 Nicke-el-it-may-ho, his x mark.
8 (L.S.) Say-i-ee-ouse, his x mark. (L.S.)
9
10 Wis-tasse-cut, his x mark. (L.S.)
11
12 Ky-ky-soo-te-lum, his x mark. (L.S.)
13
14

Ko-ko-whay-nee, his x mark. (L.S.)
Kwin-to-kow, his x mark. (L.S.)
Pee-wee-au-ap-tah, his x mark. (L.S.)
Wee-at-tenat-il-pilp, his x mark. (L.S.)
Pee-oo-pee-u-il-pilp, his x mark. (L.S.)
Wah-tass-tum-mannee, his x mark. (L.S.)
Tu-wee-si-ce, his x mark. (L.S.)
Lu-ee-sin-kah-koose-sin, his x mark. (L.S.)
Hah-tal-ee-kin, his x mark. (L.S.)

15
16 ***Signed and sealed in presence of us - -***

17
18 James Doty, secretary of treaties, W.T.
19
20 Wm. C. McKay, secretary of treaties, O.T.
21
22 W. H. Tappan, sub-Indian agent
23
24 William Craig, interpreter
25
26 A. D. Pamburn, interpreter
27
28 Wm. McBean

Geo. C. Bomford
C. Chirouse, O.M.T.
Mie. Cles. Pandosy
Lawrence Kip
W. H. Pearson

29
30 Ratified Mar. 8, 1859
31 Proclaimed Apr. 29, 1859

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8 swimref@cmc.net
9

10 *Yakima Treaty of Camp Stevens, 1855*

11
12
13
14 Articles of agreement and convention made and concluded at the treaty-ground, Camp
15 Stevens, Walla-Walla Valley, this ninth day of June, in the year one thousand eight hundred
16 and fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian affairs for
17 the Territory of Washington, on the part of the United States, and the undersigned head chiefs,
18 chiefs, head-men, and delegates of the Yakama, Palouse, Pisquouse, Wenatshapam, Klikatat,
19 Klinquit, Kow-was-say-ee, Li-ay-was, Skin-pah, Wish-ham, Shyiks, Oche-chotes, Kah-milt-pah,
20 and Se-ap-cat, confederated tribes and bands of Indians, occupying lands hereinafter bounded
21 and described and lying in Washington Territory, who for the purposes of this treaty are to be
22 considered as one nation, under the name of "Yakama," with Kamaiakun as its head chief, on
23 behalf of and acting for said tribes and bands, and being duly authorized thereto by them.
24

25 **ARTICLE 1.** The aforesaid confederated tribes and bands of Indians hereby cede, relinquish,
26 and convey to the United States all their right, title, and interest in and to the lands and country
27 occupied and claimed by them, and bounded and described as follows, to wit: Commencing at
28 Mount Ranier, thence northerly along the main ridge of the Cascade Mountains to the point
29 where the northern tributaries of Lake Che-lan and the southern tributaries of the Methow River
30 have their rise; thence southeasterly on the divide between the waters of Lake Che-lan and the
31 Methow River to the Columbia River; thence, crossing the Columbia on a true east course, to a
32 point whose longitude is one hundred and nineteen degrees and ten minutes, (119 degrees
33 10',) which two latter lines separate the above confederated tribes and bands from the
34 Oakinakane tribe of Indians; thence in a true south course to the forty-seventh (47 degrees)
35 parallel of latitude; thence east on said parallel to the main Palouse River, which two latter lines
36 of boundary separate the above confederated tribes and bands from the Spokanes; thence
37 down the Palouse River to its junction with the Moh-hah-ne-she, or southern tributary of the
38 same; thence in a southeasterly direction, to the Snake River, at the mouth of the Tucannon
39 River, separating the above confederated tribes from the Nez Perce tribe of Indians; thence
40 down the Snake River to its junction with the Columbia River; thence up the Columbia River to
41 the "White Banks" below the Priest's Rapids; thence westerly to a lake called "LaLac"; thence
42 southerly to a point on the Yakama River called Toh-mah-luke; thence, in a southwesterly
43 direction, to the Columbia River, at the western extremity of the "Big Island," between the
44 mouths of the Umatilla River and Butler Creek; all which latter boundaries separate the above
45 confederated tribes and bands from the Walla-Walla, Cayuse, and Umatilla tribes and bands of
46 Indians; thence down the Columbia River to midway between the mouths of White Salmon and
47 Wind Rivers thence along the divide between said rivers to the main ridge of the Cascade
48 Mountains; and thence along said ridge to the place of beginning.
49

50 **ARTICLE 2.** There is, however, reserved, from the lands above ceded for the use and
51 occupation of the aforesaid confederated tribes and bands of Indians, the tract of land included
52 within the following boundaries, to wit: Commencing on the Yakama River, at the mouth of the
53 Attah-nam River; thence westerly along said Attah-nam River to the forks; thence along the
54 southern tributary to the Cascade Mountains; thence southerly along the main ridge of said
55 mountains, passing south and east of Mount Adams, to the spur whence flows the waters of the
56 Klickatat and Pisco Rivers; thence down said spur to the divide between the waters of said
57 rivers; thence along said divide to the divide separating the waters of the Satass River from

1 those flowing into the Columbia River; thence along said divide to the main Yakama, eight miles
2 below the mouth of the Satass River; and thence up the Yakama River to the place of
3 beginning. All which tract shall be set apart and, so far as necessary, surveyed and marked
4 out, for the exclusive use and benefit of said confederated tribes and bands of Indians, as an
5 Indian reservation; nor shall any white man, excepting those in the employment of the Indian
6 Department, be permitted to reside upon the said reservation without permission of the tribe
7 and the superintendent and agent. And the said confederated tribes and bands agree to
8 remove to, and settle upon, the same, within one year after the ratification of this treaty. In the
9 mean time it shall be lawful for them to reside upon any ground not in the actual claim and
10 occupation of citizens of the United States; and upon any ground claimed or occupied, if with
11 the permission of the owner or claimant. Guaranteeing, however, the right to all citizens of the
12 United States to enter upon and occupy as settlers any lands not actually occupied and
13 cultivated by said Indians at this time, and not included in the reservation above named.

14
15 And provided, That any substantial improvements heretofore made by any Indian, such as
16 fields enclosed and cultivated, and houses erected upon the lands hereby ceded, and which he
17 may be compelled to abandon in consequence of this treaty, shall be valued, under the
18 direction of the President of the United States, and payment made therefor in money; or
19 improvements of an equal value made for said Indian upon the reservation. And no Indian will
20 be required to abandon the improvements aforesaid, now occupied by him, until their value in
21 money, or improvements of an equal value shall be furnished him as aforesaid.

22
23 **ARTICLE 3.** And provided, That, if necessary for the public convenience, roads may be run
24 through the said reservation; and on the other hand, the right of way, with free access from the
25 same to the nearest public highway, is secured to them; as also the right, in common with
26 citizens of the United States, to travel upon all public highways.

27
28 The exclusive right of taking fish in all the streams, where running through or bordering said
29 reservation, is further secured to said confederated tribes and bands of Indians, as also the
30 right of taking fish at all usual and accustomed places, in common with the citizens of the
31 Territory, and of erecting temporary buildings for curing them; together with the privilege of
32 hunting, gathering roots and berries, and pasturing their horses and cattle upon open and
33 unclaimed land.

34
35 **ARTICLE 4.** In consideration of the above cession, the United States agree to pay to the said
36 confederated tribes and bands of Indians, in addition to the goods and provisions distributed to
37 them at the time of signing this treaty, the sum of two hundred thousand dollars, in the following
38 manner, that is to say: Sixty thousand dollars, to be expended under the direction of the
39 President of the United States, the first year after the ratification of this treaty, in providing for
40 their removal to the reservation, breaking up and fencing farms, building houses for them,
41 supplying them with provisions and a suitable outfit, and for such other objects as he may deem
42 necessary, and the remainder in annuities, as follows: For the first five years after the
43 ratification of the treaty, ten thousand dollars each year, commencing September first, 1856; for
44 the next five years, eight thousand dollars each year; for the next five years, six thousand
45 dollars per year; and for the next five years, four thousand dollars per year.

46
47 All which sums of money shall be applied to the use and benefit of said Indians, under the
48 direction of the President of the United States, who may from time to time determine, at his
49 discretion, upon what beneficial objects to expend the same for them. And the superintendent
50 of Indian affairs, or other proper officer, shall each year inform the President of the wishes of
51 the Indians in relation thereto.

52
53 **ARTICLE 5.** The United States further agree to establish at suitable points within said
54 reservation, within one year after the ratification hereof, two schools, erecting the necessary
55 buildings, keeping them in repair, and providing them with furniture, books, and stationery, one

1 of which shall be an agricultural and industrial school, to be located at the agency, and to be
2 free to the children of the said confederated tribes and bands of Indians, and to employ one
3 superintendent of teaching and two teachers; to build two blacksmiths' shops, to one of which
4 shall be attached a tin-shop, and to the other a gunsmith's shop; one carpenter's shop, one
5 wagon and plough maker's shop, and to keep the same in repair and furnished with the
6 necessary tools; to employ one superintendent of farming and two farmers, two blacksmiths,
7 one tinner, one gunsmith, one carpenter, one wagon and plough maker, for the instruction of
8 the Indians in trades and to assist them in the same; to erect one saw-mill and one flouring-mill,
9 keeping the same in repair and furnished with the necessary tools and fixtures; to erect a
10 hospital, keeping the same in repair and provided with the necessary medicines and furniture,
11 and to employ a physician; and to erect, keep in repair, and provided with the necessary
12 furniture, the building required for the accommodation of the said employees. The said
13 buildings and establishments to be maintained and kept in repair as aforesaid, and the
14 employees to be kept in service for the period of twenty years.

15
16 And in view of the fact that the head chief of the said confederated tribes and bands of Indians
17 is expected, and will be called upon to perform many services of a public character, occupying
18 much of his time, the United States further agree to pay to the said confederated tribes and
19 bands of Indians five hundred dollars per year, for the term of twenty years after the ratification
20 hereof, as a salary for such person as the said confederated tribes and bands of Indians may
21 select to be their head chief, to build for him at a suitable point on the reservation a comfortable
22 house, and properly furnish the same, and to plough and fence ten acres of land. The said
23 salary to be paid to, and the said house to be occupied by, such head chief so long as he may
24 continue to hold that office.

25
26 And it is distinctly understood and agreed that at the time of the conclusion of this treaty
27 Kamaiakun is the duly elected and authorized head chief of the confederated tribes and bands
28 aforesaid, styled the Yakama Nation, and is recognized as such by them and by the
29 commissioners on the part of the United States holding this treaty; and all the expenditures and
30 expenses contemplated in this article of this treaty shall be defrayed by the United States, and
31 shall not be deducted from the annuities agreed to be paid to said confederated tribes and band
32 of Indians. Nor shall the cost of transporting the goods for the annuity payments be a charge
33 upon the annuities, but shall be defrayed by the United States.

34
35 **ARTICLE 6.** The President may, from time to time, at his discretion, cause the whole or such
36 portions of such reservation as he may think proper, to be surveyed into lots, and assign the
37 same to such individuals or families of the said confederated tribes and bands of Indians as are
38 willing to avail themselves of the privilege, and will locate on the same as a permanent home,
39 on the same terms and subject to the same regulations as are provided in the sixth article of the
40 treaty with the Omahas, so far as the same may be applicable.

41
42 **ARTICLE 7.** The annuities of the aforesaid confederated tribes and bands of Indians shall not
43 be taken to pay the debts of individuals.

44
45 **ARTICLE 8.** The aforesaid confederated tribes and bands of Indians acknowledge their
46 dependence upon the Government of the United States, and promise to be friendly with all
47 citizens thereof, and pledge themselves to commit no depredations upon the property of such
48 citizens. And should any one or more of them violate this pledge, and the fact be satisfactorily
49 proved before the agent, the property taken shall be returned, or in default thereof, or if injured
50 or destroyed, compensation may be made by the Government out of the annuities. Nor will
51 they make war upon any other tribe, except in self-defense, but will submit all matters of
52 difference between them and other Indians to the Government of the United States or its agent
53 for decision, and abide thereby. And if any of the said Indians commit depredations on any
54 other Indians within the Territory of Washington or Oregon, the same rule shall prevail as that
55 provided in this article in case of depredations against citizens. And the said confederated

1 tribes and bands of Indians agree not to shelter or conceal offenders against the laws of the
2 United States, but to deliver them up to the authorities for trial.

3
4 **ARTICLE 9.** The said confederated tribes and bands of Indians desire to exclude from their
5 reservation the use of ardent spirits, and to prevent their people from drinking the same, and,
6 therefore, it is provided that any Indian belonging to said confederated tribes and bands of
7 Indians, who is guilty of bringing liquor into said reservation, or who drinks liquor, may have his
8 or her annuities withheld from him or her for such time as the President may determine.

9
10 **ARTICLE 10.** And provided, That there is also reserved and set apart from the lands ceded by
11 this treaty, for the use and benefit of the aforesaid confederated tribes and bands, a tract of
12 land not exceeding in quantity one township of six miles square, situated at the forks of the
13 Pisuouse or Wenatshapam River, and known as the "Wenatshapam Fishery," which said
14 reservation shall be surveyed and marked out whenever the President may direct, and be
15 subject to the same provisions and restrictions as other Indian reservations.

16
17 **ARTICLE 11.** This treaty shall be obligatory upon the contracting parties as soon as the same
18 shall be ratified by the President and Senate of the United States. In testimony whereof, the
19 said Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of
20 Washington, and the undersigned head chief, chiefs, headmen, and delegates of the aforesaid
21 confederated tribes and bands of Indians, have hereunto set their hands and seals, at the place
22 and on the day and year hereinbefore written.

23
24 ISAAC I. STEVENS, Governor and
25 Superintendent. (L.S.)

Elit Palmer, his x mark. (L.S.)

26
27 Kamaiakun, his x mark. (L.S.)

Wish-och-kmpits, his x mark. (L.S.)

28
29 Skloom, his x mark. (L.S.)

Koo-lat-toose, his x mark. (L.S.)

30
31 Owhi, his x mark. (L.S.)

Shee-ah-cotte, his x mark. (L.S.)

32
33 Te-cole-kun, his x mark. (L.S.)

Tuck-quille, his x mark. (L.S.)

34
35 La-hoom, his x mark. (L.S.)

Ka-loo-as, his x mark. (L.S.)

36
37 Me-ni-nock, his x mark. (L.S.)

Scha-noo-a, his x mark. (L.S.)

38
39 Sla-kish, his x mark. (L.S.)

40 ***Signed and sealed in the presence of - -***

41
42 James Doty, secretary of treaties

A. D. Pamburn, interpreter

43
44 Mie. Cles. Pandosy, O. M. T.

Joel Palmer, superintendent Indian affairs,
O. T.

45
46 Wm. C. McKay

W. D. Biglow

47
48 W. H. Tappan, sub Indian agent, W. T.

A. D. Pamburn, interpreter

49
50 C. Chirouse, O. M. T.

51
52 Patrick McKenzie, interpreter

1 Ratified Mar. 8, 1859
2 Proclaimed Apr. 18, 1859

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10
11
12 ***Walla Walla Treaty of Camp Stevens, 1855***
13

14
15 Articles of agreement and convention made and concluded at the treatyground, Camp Stevens,
16 in the Walla-Walla Valley, this ninth day of June, in the year one thousand eight hundred and
17 fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian affairs for the
18 Territory of Washington, and Joel Palmer, superintendent of Indian affairs for Oregon Territory,
19 on the part of the United States, and the undersigned chiefs, head-men, and delegates of the
20 Walla-Wallas, Cayuses, and Umatilla tribes, and bands of Indians, occupying lands partly in
21 Washington and partly in Oregon Territories, and who, for the purposes of this treaty, are to be
22 regarded as one nation acting for and in behalf of their respective bands and tribes, they being
23 duly authorized thereto; it being understood that Superintendent I. I. Stevens assumes to treat
24 with that portion of the above-named bands and tribes residing within the Territory of
25 Washington, and Superintendent Palmer with those residing within Oregon.
26

27 **ARTICLE 1.** The above-named confederated bands of Indians cede to the United States all
28 their right, title, and claim to all and every part of the country claimed by them included in the
29 following boundaries, to wit: Commencing at the mouth of the Tocannon River, in Washington
30 Territory, running thence up said river to its source; thence easterly along the summit of the
31 Blue Mountains, and on the southern boundaries of the purchase made of the Nez Perces
32 Indians, and easterly along that boundary to the western limits of the country claimed by the
33 Shoshonees or Snake Indians; thence southerly along that boundary (being the waters of
34 Powder River) to the source of Powder River, thence to the head-waters of Willow Creek,
35 thence down Willow Creek to the Columbia River, thence up the channel of the Columbia River
36 to the lower end of a large island below the mouth of Umatilla River, thence northerly to a point
37 on the Yakama River, called Tomah-luke, thence to Le Lac, thence to the White Banks on the
38 Columbia below Priest's Rapids, thence down the Columbia River to the junction of the
39 Columbia and Snake Rivers, thence up the Snake River to the place of beginning: Provided,
40 however, That so much of the country described above as is contained in the following
41 boundaries shall be set apart as a residence for said Indians, which tract for the purposes
42 contemplated shall be held and regarded as an Indian reservation; to wit: Commencing in the
43 middle of the channel of Umatilla River opposite the mouth of Wild Horse Creek, thence up the
44 middle of the channel of said creek to its source, thence southerly to a point in the Blue
45 Mountains, known as Lee's Encampment, thence in a line to the head-waters of Howtome
46 Creek, thence west to the divide between Howtome and Birch Creeks, thence northerly along
47 said divide to a point due west of the southwest corner of William C. McKay's land-claim,
48 thence east along his line to his southeast corner, thence in a line to the place of beginning; all
49 of which tract shall be set apart and, so far as necessary, surveyed and marked out for their
50 exclusive use; nor shall any white person be permitted to reside upon the same without
51 permission of the agent and superintendent. The said tribes and bands agree to remove to and
52 settle upon the same within one year after the ratification of this treaty, without any additional
53 expense to the Government other than is provided by this treaty, and until the expiration of the
54 time specified, the said bands shall be permitted to occupy and reside upon the tracts now
55 possessed by them, guaranteeing to all citizen(s) of the United States, the right to enter upon
56 and occupy as settlers any lands not actually enclosed by said Indians:
57 Provided, also, That the exclusive right of taking fish in the streams running through and

1 bordering said reservation is hereby secured to said Indians, and at all other usual and
2 accustomed stations in common with citizens of the United States, and of erecting suitable
3 buildings for curing the same; the privilege of hunting, gathering roots and berries and pasturing
4 their stock on unclaimed lands in common with citizens, is also secured to them. And provided,
5 also, That if any band or bands of Indians, residing in and claiming any portion or portions of
6 the country described in this article, shall not accede to the terms of this treaty, then the bands
7 becoming parties hereunto agree to reserve such part of the several and other payments herein
8 named, as a consideration for the entire country described as aforesaid, as shall be in the
9 proportion that their aggregate number may have to the whole number of Indians residing in
10 and claiming the entire country aforesaid, as consideration and payment in full for the tracts in
11 said country claimed by them. And provided, also, That when substantial improvements have
12 been made by any member of the bands being parties to this treaty, who are compelled to
13 abandon them in consequence of said treaty, (they) shall be valued under the direction of the
14 President of the United States, and payment made therefor.
15

16 **ARTICLE 2.** In consideration of and payment for the country hereby ceded, the United States
17 agree to pay the bands and tribes of Indians claiming territory and residing in said country, and
18 who remove to and reside upon said reservation, the several sums of money following, to wit:
19 eight thousand dollars per annum for the term of five years, commencing on the first day of
20 September, 1856; six thousand dollars per annum for the term of five years next succeeding
21 the first five; four thousand dollars per annum for the term of five years next succeeding the
22 second five, and two thousand dollars per annum for the term of five years next succeeding the
23 third five; all of which several sums of money shall be expended for the use and benefit of the
24 confederated bands herein named, under the direction of the President of the United States,
25 who may from time to time at his discretion, determine what proportion thereof shall be
26 expended for such objects as in his judgment will promote their well-being, and advance them
27 in civilization, for their moral improvement and education, for buildings, opening and fencing
28 farms, breaking, land, purchasing teams, wagons, agricultural implements and seeds, for
29 clothing, provision and tools, for medical purposes, providing mechanics and farmers, and for
30 arms and ammunition.
31

32 **ARTICLE 3.** In addition to the articles advanced the Indians at the time of signing this treaty,
33 the United States agree to expend the sum of fifty thousand dollars during the first and second
34 years after its ratification, for the erection of buildings on the reservation, fencing and opening
35 farms, for the purchase of teams, farming implements, clothing, and provisions, for medicines
36 and tools, for the payment of employees, and for subsisting the Indians the first year after their
37 removal.
38

39 **ARTICLE 4.** In addition to the consideration above specified, the United States agree to erect,
40 at suitable points on the reservation, one saw-mill, and one flouring-mill, a building suitable for a
41 hospital, two school-houses, one blacksmith shop, one building for wagon and plough maker
42 and one carpenter and joiner shop, one dwelling for each, two millers, one farmer, one
43 superintendent of farming operations, two school-teachers, one blacksmith, one wagon and
44 plough maker, one carpenter and joiner, to each of which the necessary out-buildings. To
45 purchase and keep in repair for the term of twenty years all necessary mill fixtures and
46 mechanical tools, medicines and hospital stores, books and stationery for schools, and furniture
47 for employees.
48

49 The United States further engage to secure and pay for the services and subsistence, for the
50 term of twenty years, (of) one superintendent of farming operations, one farmer, one
51 blacksmith, one wagon and plough maker, one carpenter and joiner, one physician, and two
52 school-teachers.
53

54 **ARTICLE 5.** The United States further engage to build for the head chiefs of the Walla-Walla,
55 Cayuse, and Umatilla bands each one dwelling-house, and to plough and fence ten acres of

1 land for each, and to pay to each five hundred dollars per annum in cash for the term of twenty
2 years. The first payment to the Walla-Walla chief to commence upon the signing of this treaty.
3 To give to the Walla-Walla chief three yoke of oxen, three yokes and four chains, one wagon,
4 two ploughs, twelve hoes, twelve axes, two shovels, and one saddle and bridle, one set of
5 wagon-harness, and one set of plough-harness, within three months after the signing of this
6 treaty.

7
8 To build for the son of Pio-pio-mox-mox one dwelling-house, and plough and fence five acres of
9 land, and to give him a salary for twenty years, one hundred dollars in cash per annum,
10 commencing September first, eighteen hundred and fifty-six. The improvement named in this
11 section to be completed as soon after the ratification of this treaty as possible.

12
13 It is further stipulated that Pio-pio-mox-mox is secured for the term of five years, the right to
14 build and occupy a house at or near the mouth of Yakama River, to be used as a trading-post in
15 the sale of his bands of wild cattle ranging in that district: And provided, also, That in
16 consequence of the immigrant wagon-road from Grand Round to Umatilla, passing through the
17 reservation herein specified, thus leading to turmoils and disputes between Indians and
18 immigrants, and as it is known that a more desirable and practicable route may be had to the
19 south of the present road, that a sum not exceeding ten thousand dollars shall be expended in
20 locating and opening a wagon-road from Powder River or Grand Round, so as to reach the
21 plain at the western base of the Blue Mountain, south of the southern limits of said reservation.

22
23 **ARTICLE 6.** The President may, from time to time at his discretion cause the whole or such
24 portion as he may think proper, of the tract that may now or hereafter be set apart as a
25 permanent home for those Indians, to be surveyed into lots and assigned to such Indians of the
26 confederated bands as may wish to enjoy the privilege, and locate thereon permanently, to a
27 single person over twenty-one years of age, forty acres, to a family of two persons, sixty acres,
28 to a family of three and not exceeding five, eighty acres; to a family of six persons and not
29 exceeding ten, one hundred and twenty acres; and to each family over ten in number, twenty
30 acres to each additional three members; and the President may provide for such rules and
31 regulations as will secure to the family in case of the death of the head thereof, the possession
32 and enjoyment of such permanent home and improvement thereon; and he may at any time, at
33 his discretion, after such person or family has made location on the land assigned as a
34 permanent home, issue a patent to such person or family for such assigned land, conditioned
35 that the tract shall not be aliened or leased for a longer term than two years, and shall be
36 exempt from levy, sale, or forfeiture, which condition shall continue in force until a State
37 constitution, embracing such land within its limits, shall have been formed and the legislature of
38 the State shall remove the restriction: Provided, however, That no State legislature shall
39 remove the restriction herein provided for without the consent of Congress: And provided,
40 also, That if any person or family, shall at any time, neglect or refuse to occupy or till a portion
41 of the land assigned and on which they have located, or shall roam from place to place,
42 indicating a desire to abandon his home, the President may if the patent shall have been
43 issued, cancel the assignment, and may also withhold from such person or family their portion
44 of the annuities or other money due them, until they shall have returned to such permanent
45 home, and resumed the pursuits of industry, and in default of their return the tract may be
46 declared abandoned, and thereafter assigned to some other person or family of Indians
47 residing on said reservation: And provided, also, That the head chiefs of the three principal
48 bands, to wit, Pio-pio-mox-mox, Weyatenatemany, and Wenap-snoot, shall be secured in a
49 tract of at least one hundred and sixty acres of land.

50
51 **ARTICLE 7.** The annuities of the Indians shall not be taken to pay the debts of individuals.

52
53 **ARTICLE 8.** The confederated bands acknowledge their dependence on the Government of
54 the United States and promise to be friendly with all the citizens thereof, and pledge themselves
55 to commit no depredation on the property of such citizens, and should any one or more of the

1 Indians violate this pledge, and the fact be satisfactorily proven before the agent, the property
2 taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be
3 made by the Government out of their annuities; nor will they make war on any other tribe of
4 Indians except in self-defense, but submit all matter of difference between them and other
5 Indians, to the Government of the United States or its agents for decision, and abide thereby;
6 and if any of the said Indians commit any depredations on other Indians, the same rule shall
7 prevail as that prescribed in the article in case of depredations against citizens. Said Indians
8 further engage to submit to and observe all laws, rules, and regulations which may be
9 prescribed by the United States for the government of said Indians.

10
11 **ARTICLE 9.** In order to prevent the evils of intemperance among said Indians, it is hereby
12 provided that if any one of them shall drink liquor, or procure it for others to drink, (such one)
13 may have his or her proportion of the annuities withheld from him or her for such time as the
14 President may determine.

15
16 **ARTICLE 10.** The said confederated bands agree that, whenever in the opinion of the
17 President of the United States the public interest may require it, that all roads highways and
18 railroads shall have the right of way through the reservation herein designated or which may at
19 any time hereafter be set apart as a reservation for said Indians.

20
21 **ARTICLE 11.** This treaty shall be obligatory on the contracting parties as soon as the same
22 shall be ratified by the President and Senate of the United States. In testimony whereof, the
23 said I. I. Stevens and Joel Palmer, on the part of the United States, and the undersigned chiefs,
24 headmen, and delegates of the said confederated bands, have hereunto set their hands and
25 seals, this ninth day of June, eighteen hundred and fifty-five.

26		
27	Isaac I. Stevens, (L.S.)	Mu-howlish, his x mark. (L.S.)
28		
29	Governor and Superintendent Washington	Lin-tin-met-cheania, his x mark. (L.S.)
30	Territory	
31		Petamyo-mox-mox, his x mark. (L.S.)
32	Joel Palmer, (L.S.)	
33		Watash-te-waty, his x mark. (L.S.)
34	Superintendent Indian Affairs, O.T.	
35		She-yam-na-kon, his x mark. (L.S.)
36	Pio-pio-mox-mox, his x mark, head chief of	
37	Walla-Wallas. (L.S.)	Qua-chim, his x mark. (L.S.)
38		
39	Meani-teat or Pierre, his x mark. (L.S.)	Te-walca-temany, his x mark. (L.S.)
40		
41	Weyatenatemany, his x mark, head chief of	Keantoan, his x mark. (L.S.)
42	Cayuses. (L.S.)	
43		U-wait-quaick, his x mark. (L.S.)
44	Wenap-snoot, his x mark, head chief of	
45	Umatilla. (L.S.)	Tilch-a-waix, his x mark. (L.S.)
46		
47	Kamaspello, his x mark. (L.S.)	La-ta-chin, his x mark. (L.S.)
48		
49	Steachus, his x mark. (L.S.)	Kacho-rolich, his x mark. (L.S.)
50		
51	Howlish-wampo, his x mark. (L.S.)	Kanocey, his x mark. (L.S.)
52		
53	Five Crows, his x mark. (L.S.)	Som-na-howlish, his x mark. (L.S.)
54		
55	Stocheania, his x mark. (L.S.)	Ta-we-way, his x mark. (L.S.)

1 Ha-hats-me-cheat-pus, his x mark. (L.S.)
2
3 Pe-na-cheanit, his x mark. (L.S.)
4
5 Ha-yo-ma-kin, his x mark. (L.S.)
6
7 Ya-ca-lox, his x mark. (L.S.)

Na-kas, his x mark. (L.S.)
Stop-cha-yeou, his x mark. (L.S.)
He-yeau-she-keaut, his x mark. (L.S.)
Sha-wa-way, his x mark. (L.S.)
Tam-cha-key, his x mark. (L.S.)
Te-na-we-na-cha, his x mark. (L.S.)
Johnson, his x mark. (L.S.)
Whe-la-chey, his x mark. (L.S.)

8
9 ***Signed in the presence of - -***

10 James Doty, secretary treaties

James Coxey, his x mark, interpreter

11 Wm. C. McKay, secretary treaties

Patrick McKenzie, interpreter

12 C. Chirouse, O.M.I.

Arch. Gracie, Jr., brevet second lieutenant,
Fourth Infantry

13 A. D. Pamburn, interpreter

R. R. Thompson, Indian agent

14 John Whitford, his x mark, interpreter

R. B. Metcalfe, Indian sub-agent

15 Mathew Dofa, his x mark, interpreter

16 William Craig, interpreter

17 Ratified Mar. 8, 1859

18 Proclaimed Apr. 11, 1859

19

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Appendix B — Response Letters From Cooperating Agencies

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Department of Energy
 Richland Operations Office
 P.O. Box 550
 Richland, Washington 99352
 MR 04 89

97-EAP-280

Ms. Donna Powauke, Manager
 Nez Perce Indian Tribe
 Environmental Restoration/Waste Mgmt.
 P.O. Box 365
 Lapwai, Idaho 83540

Dear Ms. Powauke:

INVITATION TO PARTICIPATE IN DEVELOPMENT OF FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, the Department of Energy, Richland Operations Office (RL) is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December public 1996 meeting the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

RL is inviting you to participate in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations For Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of tribal governments and cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that the Nez Perce provide information and analysis for those portions of the environmental impact statement in which you have special expertise, to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and your comments will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attached), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. RL will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.

Ms. Powauke
 97-EAP-280

-2-

MAR 4 1997

Once again, we appreciate your interest in participating in the HRA-EIS. My staff will be contacting you to see whether you will accept this invitation to participate, to identify your point of contact, and to make arrangements for consultation meetings. If you have any other questions, please contact me or Tom Ferns (509) 372-0649 or Paul Krupin (509) 372-1112, of my staff.

Sincerely,

John D. Wagoner
 John D. Wagoner
 Manager

EAP:PJK

Attachment

cc w/attachment:
 J. Fitch, Nez Perce
 S. Penney, Nez Perce
 C. Lawyer, Nez Perce

B-1

Appendix B

Please note that all letters to the cooperating agencies from the U.S. Department of Energy, Richland Operations Office (RL) included Attachment 1 and a list of carbon copied individuals. However, the attachment to the RL letter and carbon copy page are only shown here with the first RL invitation letter in this Appendix section.

Attachment 1

**Key Milestone Dates for Completion of
The Final Hanford Remedial Action Environmental Impact Statement
and Comprehensive Land Use Plan**

Initiate Strategy Meetings With Cooperating Agencies	January 31, 1997
Finalize Land Use Alternatives	February 27, 1997
Develop Impact Analysis	May 15, 1997
Initial Draft Final EIS	June 4, 1997
Public Comment Response Document	June 5, 1997
Cooperative Agency Internal Review & Comment Resolution	July 25, 1997
Final EIS to Printer	October 15, 1997
Final EIS to Public	November 24, 1997
Notice of Availability in Federal Register	December 8, 1997
45 Day Waiting Period Closes	February 11, 1998
Final Record of Decision	March 11, 1998
Record of Decision/Future Use Plan	March 15, 1998



Nez Perce

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
P.O. BOX 385 • LAPWAI, IDAHO 83540-0385 • (208) 843-7375 | FAX: 843-7378

April 28, 1997

Mr. John Wagoner
U.S. DOE, Mail Stop A7-50
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

RE: Invitation to Participate in Development of Final Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan, March 4, 1997

Dear Mr. Wagoner:

The Nez Perce Tribe Department of Environmental Restoration and Waste Management (ERWM) appreciates being invited to participate in development of Final Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan. Thus far, these meetings have been productive, and we are encouraged by these interactions that contribute to open communication and the free flow of information. Meetings such as these fulfill the partnership embodied in the Cooperative Agreement between the U.S. DOE and Nez Perce Tribe. Tribal consultation, on future Hanford Site land use directly impacts our most important resource, the Columbia River, is of utmost concern to the Nez Perce People. Our rights to the Mid-Columbia were retained in the Treaty of 1855 and were affirmed through a series of federal and state actions.

We look forward to an even greater participation in this process. In fact, we foresee our tribal input greatly surpassing that outlined in your letter dated March 4, 1997. Particularly, we expect to be included in the decision making process as well as writing the land use plan. The first step in this process is development of a revised draft plan, to be submitted for public comment.

Once again, thank you for this invitation, and we look forward a productive and congenial process with all of the involved governments in deciding the best future use of the Hanford Site which will most benefit all of the people. Staff members assigned to this project are Richard Buck, Stan Sobczyk, and Paul Danielson all at (208) 843-7375 or (208) 843-7378 (fax). Please do not hesitate to contact them throughout the development of the plan.

Sincerely,

Donna L. Powaukee
Nez Perce Tribe ERWM Manager

cc: Tom Ferns, DOE-RL
Paul Krupin, DOE-RL
Lloyd Piper, DOE-RL, Assistant Site Manager
Kevin Clarke, DOE-RL, Indian Programs Manager
Russell Jim, YIN, ERWM Manager
J.R. Wilkinson, CTUIR, SSRP Manager

RECEIVED
MAY 01 1997
DOE-RL/DIS



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

NR 04 09

97-CAP-281

Mr. J. R. Wilkinson
Confederated Tribes of the
Umatilla Indian Reservation
Cultural Resources Protection Program
P.O. Box 638
Pendleton, OR 97801

Dear Mr. Wilkinson:

INVITATION TO PARTICIPATE IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, the Department of Energy, Richland Operations Office (RL) is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December public 1996 meeting the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

RL is inviting you to participate in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations For Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of tribal governments and cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that the Confederated Tribes of the Umatilla Indian Reservation provide information and analysis for those portions of the environmental impact statement in which you have special expertise, to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and your comments will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attached), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. RL will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



DEPARTMENT of
NATURAL RESOURCES
Administration

CONFEDERATED TRIBES
of the

Umatilla Indian Reservation

P.O. Box 638
PENDLETON, OREGON 97801
Area code 541 Phone 276-3447 FAX 276-3317

April 3, 1997

Mr. John Wagoner, Manager
Richland Operations Office
U.S. Department of Energy
P.O. Box 550, A7-50
Richland, WA 99352

Subject: CTUIR Participation in the Completion of Hanford's Land Use EIS

Dear Mr. Wagoner:

I am writing in response to your letter, dated March 4, 1997, in which you invite the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) to become a "cooperating agency" (as defined by regulations of the U.S. Council on Environmental Quality) in the further development of the Hanford Remedial Action Environmental Impact Statement (HRA-EIS). The purpose of this letter is to formally notify you that the CTUIR has accepted your offer.

In the view of the CTUIR, the last four years of the U.S. Department of Energy, Richland Operations Office's (DOE/RL) HRA-EIS effort has been characterized by a failure to clearly define the purpose and goal of the EIS and to structure an appropriate process around achieving that goal. If the CTUIR believed DOE/RL were continuing in that vein, we would not agree to become a cooperating agency.

Since February of this year, however, DOE/RL has repeatedly stated that it is taking a new approach to the HRA-EIS. In meetings with DOE/RL staff in February 1997, CTUIR staff were informed that DOE would be "refocusing" the EIS around the development of the Hanford Comprehensive Land Use Plan. In so doing, DOE would drop those portions of the August DEIS which had attempted to control remediation decisions. These portions include the risk analysis and the analysis of the site in terms of six geographic areas, as well as other large portions of the August DEIS. Instead, DOE would now analyze its proposed land use plan by comparing that plan with alternative land use plans for Hanford. Governments and agencies that had demonstrated an interest in this process were invited to become cooperating agencies, to assist in the completion of the EIS.

The CTUIR views these changes as both logical and necessary. From its earliest beginnings in the Hanford Future Site Uses Working Group process, the obvious reason for the creation of this EIS has always been to enact a land use plan for Hanford. Yet the process DOE/RL adopted which led to the August 1996 DEIS was singularly inappropriate for achieving this goal. Unlike the "remediation" theme, the need for and purpose of a land use plan is obvious, as is the proper application of the

NEPA process to such a plan. By removing remediation decision making from the EIS, and refocussing the EIS on land use planning, DOE is returning to its proper role as site manager and (for the first time since 1992) taking a logical and legal approach to the task of land use planning.

The CTUIR has been a cooperating agency on this refocussed EIS since early March, when the CTUIR began participating in DOE's twice-a-week meetings on this project. It is our experience in these meetings which has convinced the CTUIR that DOE is indeed taking a new approach to this EIS, an approach which is more efficient, more effective and more satisfactory to all participants. More work has been accomplished -- and more consensus has been developed -- in a month of these meetings than in the entire prior four years of DOE's effort. These meetings have been the secret of DOE's new-found success on this project, and must continue if DOE is to sustain that success.

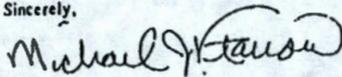
Yet DOE must make some additional changes if it is truly going to capitalize on the opportunity this "fresh start" provides. To stop short of these steps is to leave the project half-reformed, condemning it to eventual failure.

The first of these reforms is that DOE/RL must acknowledge that this new edition of this EIS, which DOE/RL described and committed to in February, and which we have been diligently drafting for the past month, bears virtually no resemblance to the August 1996 DEIS. As a legal consequence, we must call the version we are currently drafting a Revised Draft EIS. To do otherwise is to invite a lawsuit which the plaintiffs would almost certainly win. This would result in even further delays, expense and embarrassment for DOE, and would be a disservice to those of us who are eager to compete and implement this process.

Likewise, DOE/RL and the cooperating agencies must define a mechanism, analogous to a county planning commission, for implementing and enforcing the Hanford Comprehensive Land Use Plan once it is adopted. Without such a mechanism this entire effort will simply be a paper exercise, which will be ignored as soon as it is completed. The cooperating agencies must assist in the creation and implementation of this mechanism.

In closing, while it has never been clear why DOE/RL was attempting a remediation EIS, the need for a land use EIS is obvious. The CTUIR has become a cooperating agency because DOE/RL has committed to us that it is now engaged in writing a land use EIS. The success of the semi-weekly meetings has demonstrated that this new process works. Nevertheless, the early success demonstrated by these meetings will eventually fail if DOE/RL fails to take additional necessary reforms. The CTUIR looks forward to being DOE/RL's partner in bringing this project to successful conclusion. Your staff can reach the CTUIR's point of contact for these matters, Chris Buford, at (541) 278-5209.

Sincerely,



Michael J. Farrow
Director
Department of Natural Resources

cc: Yakama Indian Nation
Nez Perce Tribe

Benton County
Franklin County
Grant County
City of Richland
U.S. Bureau of Land Management
U.S. Fish and Wildlife Service
Washington Department of Fish and Wildlife
Hanford Natural Resource Trustee Council
U.S. DOE/HQ:
Carl Dean Monroe
Mary Harmon
U.S. DOE/RL:
Lloyd Piper
Linda Bauer
Paul Krupin
Thomas Ferns
Kevin Clark
Council on Environmental Quality

Appendix B



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

RL 0 4 1997

97-EAP-278

The Honorable Leroy Allison
Chairman
Board of Grant County Commissioners
P.O. Box 37
Ephrata, Washington 98828

Dear Mr. Allison:

INVITATION TO PARTICIPATE AS A COOPERATING AGENCY IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, RL is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December 1996 meeting, the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This letter addresses specific agency requests for cooperating agency status to address land use planning and process issues.

RL is inviting you to participate as a "Cooperating Agency" under the National Environmental Policy Act (NEPA) in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that your organization develop information and prepare environmental analyses addressing those portions of the environmental impact statement in which you, as a cooperating agency, have special expertise and make available staff to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attachment 1), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. DOE will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.

B-6

05/22/97 13:14:37

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Page 002



May 14, 1997

GRANT COUNTY
OFFICE OF
BOARD OF COUNTY COMMISSIONERS

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John Wagoner, Manager
Richland Operations Office
U.S. Department of Energy
P.O. Box 550, A7-3D
Richland, WA 99352

Re: Grant County Participants as a Cooperating Agency in development of Hanford Remedial Action Environmental Impact Statement (HRA-EIS) and Comprehensive Land Use Plan

Dear Mr. Wagoner:

The Board of Grant County Commissioners (the "County") accepts DOE-RL's invitation to participate as a "cooperating Agency" in the preparation of the HRA-EIA and comprehensive land use plan. The Board is pleased that DOE-RL has decided to redirect the HRA EIS and land use plan to more directly support Hanford Comprehensive Land Use Planning and to broaden agency participation and involvement. A cooperative effort among the jurisdictions, sovereignties and agencies with land use interests on Hanford is the appropriate way to proceed.

The Board's objectives for this process are the following:

1. A final Environmental Impact Statement (EIS) and record of decision (ROD) which meets cooperating agencies' NEPA and state SEPA requirements, and provides the public the opportunity to review and comment on this fundamentally changed EIS land use plan. Because of these fundamental changes, we believe it will be necessary to issue an additional draft for public review and comment before the final EIS and ROD. It is important to obtain input from the cooperating agencies, stakeholders, and the Grant County region citizens on this issue.

THE BUREAU
DATE
MAY 14 1997

HELEN FANCHER
DATE
MAY 14 1997

LEROY ALLISON
DATE
MAY 14 1997

John Wagoner, Manager
May 14, 1997
Page - 2

2. The final EIS and ROD must identify:

- a. the preferred land use map(s);
- b. unresolved issues and impediments to realizing the land use plan; and
- c. implementing mechanisms and actions to be undertaken among cooperating agencies to resolve outstanding issues. Examples of outstanding issues at this time are water availability for non-DOE uses and the underlying ownership of Bureau of Land Management land in a checkerboard fashion across the state.

Grant County (the "County") pledges to support this effort in full faith by providing our expertise for the process as it relates to our land use alternatives to be included in the EIS. We will not commit resources to activities which are unilaterally DOE's responsibility, such as preparing information related to Hanford cleanup activities and federal legal requirements, document printing and distribution, reserving hearing locations, etc.

Thank you for your invitation to participate in the HRA Comprehensive Land Use Plan EIS as a cooperating agency. The County looks forward to a productive and meaningful effort, which can result in a product which meets the needs of DOE and cooperating agencies in the near and long-term, and formally defines our continued working relationship.

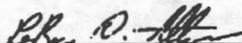
The County's "point-of-contact" for this cooperative effort will be Larry N. Angell, Planning Director. Mr. Angell can be contacted at (509) 734-2011, Ext. 493.

John Wagoner, Manager
May 14, 1997
Page - 3

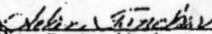
Thank you for your courtesies.

Very truly yours,

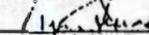
BOARD OF COUNTY COMMISSIONERS
GRANT COUNTY, WASHINGTON



LeRoy D. Allison, Chair



Helea Fancher, Member



Tim Sneed, Member

LCA:bp

cc: Larry N. Angell, Planning Director
Benton County
Franklin County
BLM
CTUIR
DOE
USFW
WDFM
Trustees Council

HL CONTROL
MAY 19 1997
RICHLAND
OPERATIONS OFFICE



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
BR 04 87

97-EAP-262

The Honorable Max Benitz
Chairman
Board of Benton County Commissioners
P.O. 190
Prosser, Washington 99350

Dear Mr. Benitz:

INVITATION TO PARTICIPATE AS A COOPERATING AGENCY IN DEVELOPMENT OF FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, RL is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December 1996 meeting, the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This letter addresses specific agency requests for cooperating agency status to address land use planning and process issues.

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01/01/97 14:20



Board of County Commissioners
BENTON COUNTY

P.O. Box 190 • Prosser, WA 99350-0190
Phone (509) 786-5600 or (509) 736-3080
Fax (509) 786-5625

Leo Bowman
DISTRICT 1
Max Benitz, Jr.
DISTRICT 2
Claude L. Oliver
DISTRICT 3

March 28, 1997

John Wagoner, Manager
U. S. Department of Energy
Richland Operations Office
P O Box 550, A7-50
Richland, WA 99352

RE: Invitation to Participate as Cooperating Agency in Development of Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan

Dear Mr. Wagoner:

The Board of Benton County Commissioners accepts DOE-RL's invitation to participate as a "cooperating agency" in the preparation of the HRA-EIS and comprehensive land use plan. The Board is pleased that DOE-RL has decided to redirect the HRA-EIS and land use plan to more directly support Hanford Comprehensive Land Use Planning, and to broaden agency participation and involvement. A cooperative effort among the jurisdictions, sovereigns and agencies with land use interests on Hanford is the appropriate way to proceed.

The Board's objectives for this process are the following:

- (1) A final EIS and record of decision (ROD) which meets cooperating agencies' NEPA and state SRPA requirements, and provides the public opportunity to review and comment on this fundamentally changed EIS land use plan. Because of these fundamental changes, we believe it will be necessary to issue an additional draft for public review and comment before the final EIS and ROD. It is important to obtain input from the cooperating agencies, stakeholders, and the Tri-Cities region citizens on this.
- (2) The final EIS and ROD must identify: a) the preferred land use map(s); b) unresolved issues and impediments to realizing the land use plan; c) implementing mechanisms and actions to be undertaken among cooperating agencies to resolve outstanding issues. Examples of outstanding issues at this time are water availability for non-DOE uses and the underlying ownership of Bureau of Land Management land in a checkerboard fashion across the site.

The county pledges to support this effort in full faith by providing our expertise for the process as it relates to our land use alternatives to be included in the EIS. We will not commit resources to activities which are unilaterally DOE's responsibility, such as preparing information related to Hanford cleanup

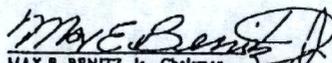
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activities and federal legal requirements, document printing and distribution, reserving hearing locations, etc.

Again, thank you for the invitation to participate in the HRA Comprehensive Land Use Plan EIS as a cooperating agency. The County looks forward to a productive and meaningful effort, which can result in a product which meet the needs of DOE and cooperating agencies in the near and long-term, and formally defines our continued working relationship.

The Beaton County point-of-contact for this cooperative effort will be Phil Mees, Senior Planner-Long Range. Mr. Mees can be reached at (509) 736-3066.

Sincerely,


MAX B. BENITZ, Jr., Chairman
BOARD OF COUNTY COMMISSIONERS

cc: BLM
USFW
CTUR
Nas Perce
Yakama
Ecology
WDFW
Trustees Council
City of Richland
Grant County
Franklin County

RL COMMITMENT
CONTROL
MAR 31 1997
RICHLAND
OPERATIONS OFFICE



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

NR 04 US

97-EAP-283

Mr. Carroll Palmer
Yakama Indian Nation
P.O. Box 151
Toppenish, WA 98948

Dear Mr. Palmer:

INVITATION TO PARTICIPATE IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, the Department of Energy, Richland Operations Office (RL) is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December public 1996 meeting the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

RL is inviting you to participate in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations For Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of tribal governments and cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that the Yakama Indian Nation provide information and analysis for those portions of the environmental impact statement which you have special expertise, to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and your comments will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attached), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. RL will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



Confederated Tribes and Bands
of the Yakama Indian Nation

Established by the
Treaty of June 9, 1855

March 13, 1997

Mr. John D. Wagoner, Manager
Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Dear Mr. Wagoner:

This letter is in response to your invitation to the Yakama Nation to participate in the development of the Final Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). We appreciate your offer to participate as a cooperating agency. We believe that the Yakama Nation has both jurisdiction by law and special expertise that would be of valuable assistance in preparation of a comprehensive land use plan for the Hanford Site. However, we have serious concerns over the direction that DOE has chosen to proceed with the EIS, as well as the timing of this invitation to serve as a cooperating agency.

During the comment period for the Draft EIS, the Yakama Nation submitted written comments identifying what we judged to be significant procedural flaws in the document. Based upon our understanding of the Council on Environmental Quality's (CEQ) Regulations For Implementing the Procedural Provisions of NEPA, deficiencies in scope, alternative analysis, cumulative impacts discussions necessitate the preparation and circulation of a revised Draft EIS. We believe that decisions made regarding the current direction of the EIS process only serve to weaken an already tenuous legal position should this EIS be challenged on procedural grounds. We request that DOE reconsider the decision to proceed directly to a Final EIS.

CEQ regulations regarding cooperating agencies, as cited in your letter, require the lead agency to request the participation of each cooperating agency at the earliest time possible in the NEPA process. The lead agency shall allocate assignments among the lead and cooperating agencies during the scoping period. CEQ guidance (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations) indicates that the majority of cooperating agency participation should occur during the scoping process and the preparation of the Draft EIS. Inviting the Yakama Nation to participate as a cooperating agency at this late stage of the process is clearly not consistent with the intent of CEQ regulations and guidance.

Despite these concerns, we can certainly see the value in developing a comprehensive land use plan which will support DOE's mission at the Hanford Site by guiding land and facility use decisions and protecting the valuable cultural and natural resources at the site. We are willing to participate along with DOE and other stakeholders in the development of such a plan. However, we request that you clarify certain relevant points before we make any commitments in response to your invitation.

Post Office Box 151, Fort Road, Toppenish, WA 98948 (509) 865-5121

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(1) Statement of Underlying Need

The Draft EIS indicates that DOE is addressing a need to establish "future land-use objectives" which will drive the remediation process. Since this is no longer DOE's direction, we are requesting a clear statement regarding what needs will now be addressed by the HRA EIS and Comprehensive Land Use Plan. Without a clear statement of the underlying need of the proposal, there is not sufficient information to suggest alternatives which meet that need, nor to assess which of a range of alternatives best addresses that need.

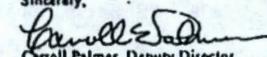
(2) Rationale for Not Preparing a Revised Draft EIS

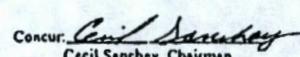
As expressed in our December 10, 1996 comments on the Draft EIS, and reiterated above, we believe that significant inadequacies in the Draft EIS must be corrected through preparation and circulation of a revised Draft. We now understand that we will see at least four alternatives in the Final EIS, none of which were analyzed in the Draft. We are requesting a short statement from DOE-RL indicating how the decision to proceed directly to a Final EIS is consistent with the objectives and procedures of NEPA. As you can imagine, we are hesitant to devote more time and resources to a process that we see as so procedurally flawed as to openly invite legal challenge from any party not satisfied with the outcome.

(3) Role of Cooperating Agencies

Because cooperating agencies are expected to be involved primarily in the scoping process and in the preparation of the Draft EIS, we are unclear as to what DOE expects of cooperating agencies at this late stage of the process. The CEQ regulations state that the lead agency shall allocate assignments for preparation of the EIS among the lead and cooperating agencies. We are requesting a statement from DOE-RL regarding what responsibilities would be assigned to cooperating agencies, and how we are expected to coordinate with DOE as well as with other cooperating agencies.

Again, we thank you for this invitation to participate in the development of the HRA EIS. We believe because of our jurisdiction by law and special expertise that it is important for the Yakama Nation to be involved in land use planning efforts at the Hanford Site. We await your response to the information requested above so we may make an informed decision regarding our level of participation in this process. Until that time our staff will continue to be involved in ongoing efforts supporting land use planning at Hanford.

Sincerely,

Carroll Palmer, Deputy Director
Yakama Nation, Division of Natural Resources

Concur: 
Cecil Sanchez, Chairman
Radioactive/Hazardous Waste Committee



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
MAR 04 1998

97-EAP-276

The Honorable Frank Brock
Chairman
Board of Franklin County Commissioners
1016 N. 4th
Pasco, Washington 99302

Dear Mr. Brock:

INVITATION TO PARTICIPATE AS A COOPERATING AGENCY IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, RL is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December 1996 meeting, the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This letter addresses specific agency requests for cooperating agency status to address land use planning and process issues.

RL is inviting you to participate as a "Cooperating Agency" under the National Environmental Policy Act (NEPA) in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that your organization develop information and prepare environmental analyses addressing those portions of the environmental impact statement in which you, as a cooperating agency, have special expertise and make available staff to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attachment 1), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. DOE will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
MAR 04 1998

97-EAP-277

The Honorable Larry Haler
Mayor of the City of Richland
505 Swift Boulevard
Richland, Washington 99352

Dear Mayor Haler:

INVITATION TO PARTICIPATE AS A COOPERATING AGENCY IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, RL is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December 1996 meeting, the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This letter addresses specific agency requests for cooperating agency status to address land use planning and process issues.

RL is inviting you to participate as a "Cooperating Agency" under the National Environmental Policy Act (NEPA) in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations For Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that your organization develop information and prepare environmental analyses addressing those portions of the environmental impact statement in which you, as a cooperating agency, have special expertise and make available staff to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attachment 1), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. DOE will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



Department of Energy
 Richland Operations Office
 P.O. Box 550
 Richland, Washington 99352
 WA 04 BW

97-EAP-282

Ms. Lenora Seelatsee
 Wanapum
 Grant County PUD
 P.O. Box 878
 Ephrata, WA 98823

Dear Ms. Seelatsee:

INVITATION TO PARTICIPATE IN DEVELOPMENT OF THE FINAL HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND USE PLAN

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, the Department of Energy, Richland Operations Office (RL) is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December public 1996 meeting the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

RL is inviting you to participate in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of tribal governments and cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that the Wanapum provide information and analysis for those portions of the environmental impact statement in which you have special expertise, to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and your comments will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attached), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. RL will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
MAY 04 1997

97-EAP-264

Mr. Preston Sleeper
U.S. Department of Interior
Office of Environmental Policy and Guidance
500 NE Multnomah Street, Suite 600
Portland, Oregon 97232-2036

Dear Mr. Sleeper:

**INVITATION TO PARTICIPATE AS A COOPERATING AGENCY IN DEVELOPMENT OF FINAL
HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND
USE PLAN**

Thank you for your comments on the Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (HRA-EIS). This letter serves as notice the Department of Energy, Richland Operations Office (RL) plans to develop the Final HRA-EIS. In order to respond to the comments received from Tribal governments, regulatory agencies and the public, RL is writing the Final HRA-EIS to emphasize land use planning. As we clarified at the December 1996 meeting, the EIS is not intended to make specific cleanup decisions that have already been made or will be made in the future under the Resources Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This letter addresses specific agency requests for cooperating agency status to address land use planning and process issues.

RL is inviting you to participate as a "Cooperating Agency" under the National Environmental Policy Act (NEPA) in the development of the Final HRA-EIS, consistent with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR 1501.6. Consistent with the CEQ guidance, RL will use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible, consistent with its responsibility as lead agency. RL is requesting that your organization develop information and prepare environmental analyses addressing those portions of the environmental impact statement in which you, as a cooperating agency, have special expertise and make available staff to support the development of the Final EIS. The addition of your specialized knowledge will be of great value to the land use planning process and will be incorporated into the final EIS. RL looks forward to your cooperation, involvement and assistance in the planning of Hanford's future land uses.

RL is on a strict schedule (Attachment 1), established by Public Law 104-201, Section 3153, to meet a March 15, 1998, deadline for a 50-year future use plan. We are reorganizing material in the draft EIS and are not rescoping the HRA-EIS. DOE will focus on revisions to the existing Draft HRA-EIS such that the analyses and terminology in the Comprehensive Land Use Plan are the emphasis in the Final HRA-EIS.



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

052597

OCT 27 1997

Mr. Thomas J. Dwyer
 Acting Regional Director
 U.S. Department of the Interior
 Fish and Wildlife Service
 911 N.E. 11th Avenue
 Portland, Oregon 97232-4181

Dear Mr. Dwyer:

REQUEST FOR STATUS AS A COOPERATING AGENCY IN THE PREPARATION OF THE DRAFT
 HANFORD REMEDIAL ACTION ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE LAND
 USE PLAN (HRA EIS CLUP).

In response to the ARM-RE letter to Mr. John Wagoner from you, same subject as
 above, dated September 17, 1997, this letter is to confirm the verbal
 invitation to participate as a Cooperating Agency that has been extended to
 the U.S. Department of the Interior (DOI), Fish and Wildlife Service (FWS),
 representative Mr. Dave Goetz of the Saddle Mountain National Wildlife Refuge.

Other DOI offices have expressed an interest in being Cooperating Agencies on
 this HRA EIS CLUP. DOI's Spokane District Office of the Bureau of Land
 Management (BLM) heightened the U.S. Department of Energy's (DOE) awareness in
 a DOI letter to Mr. John Wagoner from Ms. Ann B. Aldrich, same subject as
 above, dated February 3, 1997. BLM's request for status as a Cooperating
 Agency led to DOE inviting DOI to participate as a Cooperating Agency (DOE
 letter to Mr. Preston Sleeper, DOI Portland, Oregon Office of Environmental
 Policy and Guidance from Mr. John D. Wagoner "Invitation to Participate as a
 Cooperating Agency in Development of Final Hanford Remedial Action
 Environmental Impact Statement and Comprehensive Land Use Plan," dated
 March 4, 1997). In-turn, the Cooperating Agencies advised DOE to start anew
 with a revised Draft HRA EIS CLUP, on which DOE is currently working.

Although the time isn't available for FWS to develop its own alternative for
 the HRA EIS CLUP, there are six independently developed alternatives to
 comment on. DOE has taken Mr. William F. Shake's concerns on the potential
 for mining and grazing on the Fitzner Eberhardt Arid Lands Ecology Reserve
 (ALE) into account in the development of DOE's preferred alternative (DOE
 letter to Mr. William F. Shake from Mr. James E. Rasmussen "Potential for
 Mining and Grazing (Conservation Designation)," dated October 8, 1997). DOE
 understands the FWS's desire to participate and believes that FWS
 participation in this National Environmental Policy Act (NEPA) process will
 assist in the FWS's development of a management plan for the ALE. DOE
 appreciates DOI's staff-line support and intends to seek the FWS's advice
 throughout the HRA EIS CLUP NEPA decision process.

Mr. Thomas J. Dwyer

-2-

052597 OCT 27 1997

If you want to discuss this matter further or require additional information,
 please contact me at (509) 377-0649.

Sincerely,

Thomas W. Ferns, NEPA Document Manager
 Hanford Remedial Action Environmental
 Impact Statement

RAP:TMF



U.S. DEPARTMENT OF THE INTERIOR

United States Department of the Interior

FISH AND WILDLIFE SERVICE

911 NE 11th Avenue
Portland, Oregon 97232-4181

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Mr. John Wagoner, Manager
Department of Energy
Richland Operations Office
P.O. Box 550, Stop A7-50
Richland, Washington 99352

Dear Mr. Wagoner:

The U.S. Fish and Wildlife Service (Service) requests status as a Cooperating Agency in preparation of the draft Hanford Site Comprehensive Land Use Plan (CLUP) and Environmental Impact Statement (EIS). The Service does not expect to attend every meeting or comment on all aspects of the document, but would like to focus expertise, text and review on topics that involve the trust resources we are managing, or may be asked to manage in the near future. As a cooperator, the Service would provide the following:

- Preparation of text describing the Service's mission, role and constraints of managing land under the National Wildlife Refuge System.
- Review of land uses proposed for the Arid Land Ecology Reserve (ALE), McGee Ranch, North Slope, and the Columbia River corridor.
- Review of the draft CLUP for compatibility of land uses with typical habitat management actions conducted on the National Wildlife Refuge System on the ALE, McGee Ranch, North Slope, and the Columbia River corridor.

The Department of Energy's (DOE) benefits from Service cooperator status include:

- A CLUP that is coordinated and consistent with the mission of the National Wildlife Refuge System for areas under Service management, or potential future management (ALE, McGee Ranch, North Slope, and the Columbia River corridor).
- Service provision of expertise on refuge matters without requiring the EIS team to research the topic.
- Savings of tax dollars since the Service could tier refuge planning documents from the CLUP EIS and record of decision. Without cooperator status, the Service faces preparation of another EIS for refuge comprehensive management planning that would extensively duplicate the material in this EIS

Mr. John Wagoner

2

- A CLUP that meets existing public expectation that wildlife habitat on the ALE and North Slope will be protected and/or managed by the Service, and that the Service has contributed to the CLUP for these areas. Public expectations are based on the Hanford Reach EIS and ROD, and the recently announced ALE management agreement.

We look forward to assisting you with the draft CLUP and EIS. Please contact Dave Coeke, Project Leader, at (509) 488-2668 if you need additional information.

Sincerely,

Thomas J. Dwyer
[Signature]
Regional Director

Acting

RL COMMITMENT CONTROL

SEP 22 1997

RICHLAND OPERATIONS OFFICE

B-17

Appendix B

Appendix C — Floodplain/Wetlands Assessment

Floodplains and wetlands on the Hanford Site (including portions of the Columbia River, Yakima River, and Cold Creek floodplains; associated wetlands; and other wetlands and deep water habitats on the Hanford Site) could be affected under each of the land-use alternatives that are identified in this Final HCP EIS. The magnitude of these effects depends, in part, on the land-use designations associated with the floodplains and wetlands under each alternative. Floodplains and wetlands are protected from any adverse Federal actions by several laws, regulations, and orders. This Floodplain/Wetlands Assessment identifies the floodplains and wetlands potentially affected by future land-use designations under each alternative. This appendix also provides a brief discussion of floodplain and wetland natural functions and values, as well as the steps to minimize impacts on floodplains and wetlands. The alternatives identified in this assessment are described in detail in Chapter 3.

C.1 Introduction

Under Executive Order 11988, *Floodplain Management*, and Executive Order 11990, *Protection of Wetlands*, Federal agencies are required to consider the impact of proposed actions on wetlands and floodplains. The U.S. Department of Energy (DOE) requirements for compliance with Executive Orders 11988 and 11990 are found in Title 10, *Code of Federal Regulations* (CFR), Part 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements." A floodplain/wetlands assessment consists of a description of the proposed action, a discussion of its effects on the floodplain and wetlands, and consideration of the alternatives. The Executive Orders are intended to be used by Federal agencies to implement floodplain and wetland requirements through existing procedures, such as those established to implement the *National Environmental Policy Act of 1969* (NEPA).

If DOE determines that there is no alternative to implementing a proposed project in a floodplain or wetland, a brief statement of findings must be prepared. This statement of findings would include a description of the proposed action, an explanation indicating why the project must be located in a floodplain or wetland, a list of alternatives considered, measures that will be taken to comply with state and local floodplain protection standards, and a description of the steps to be taken to minimize adverse impacts to the floodplain or wetland.

C.1.1 Floodplains Potentially Affected

A floodplain is defined as "... lowlands adjoining inland and coastal waters and relatively flat areas and flood-prone areas of offshore islands including, at a minimum, that area inundated by a 1 percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical floodplain is defined as the 500-year (0.2 percent) floodplain. . ." (10 CFR 1022).

When maintained in a natural state, floodplains provide valuable services by moderating the extent of flooding, thereby (1) reducing the risk of downstream flood loss; (2) minimizing the impacts of floods on human safety, health, and welfare; and (3) providing support to wetlands, fish, and wildlife.

For the purposes of this assessment, the extent of the 100-year floodplains for the Columbia River, Yakima River, and Cold Creek was derived from a number of sources (Neitzel et al. 1997; USACE 1970; Skaggs and Walters 1981; and DOE 1987). The water flow of both the Yakima and Columbia Rivers is regulated by dams located upstream of the Hanford Site. This flow regulation serves to significantly dampen the 100-year floods. For example, on the Hanford Site, the dam-regulated, 100-year flood for the Columbia River only extends beyond

1 the existing riverbed in certain isolated and shallow zones. A 100-year flood would inundate
2 marshy areas located upstream of the 100-B Reactor and a portion of the low-lying horn of land
3 located downstream of the 100-D Reactor, but is not expected to completely inundate the
4 islands in the Columbia River. Of the 1,142 ha (2,821 ac) of land area associated with these
5 islands, 744 ha (1,838 ac) would be inundated by a 100-year flood.
6

7 Although the 100-year floodplain of the ephemeral Cold Creek has not been mapped, it
8 is possible to draw preliminary conclusions from a 1981 Flood Risk Analysis (Skaggs and
9 Walters 1981) to determine the historical extent of the watershed. In this analysis, at least two
10 distinct segments were described: (1) an upper reach extending from the headwaters to just
11 south of the 200 West Area, and (2) a lower reach extending from near the confluence with Dry
12 Creek, which is located on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve),
13 to Horn Rapids on the Yakima River. As the upper reach of Cold Creek enters the Hanford
14 Site, gradients diminish significantly. As a result, the channel becomes braided and
15 interconnected. The floodplain essentially follows State Highway 240 through the Hanford Site.
16 Conservative values for precipitation events and magnitudes of infiltration, surface roughness,
17 and topographic parameters were used for the preliminary estimates of probable maximum
18 flooding conditions for the Cold Creek watershed. Based on the estimate and location of the
19 probable maximum flood, it is possible to estimate the potential impact of Hanford Site remedial
20 actions on the much smaller 100-year floodplain of Cold Creek. The 100-year floodplain of
21 Cold Creek probably would not include land within the boundary of the Central Plateau
22 geographic area.
23

24 **C.1.2 Wetlands Potentially Affected**

25
26 The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (EPA
27 et al. 1989) defines wetlands by the presence of hydric soils, hydrophytic vegetation, and
28 wetlands hydrology. Hydric soils are soils with the seasonal high-water table within 2.5 cm
29 (1 in.) of the surface of the ground for at least 1 week of the growing season. As a result,
30 hydric soils typically experience an oxygen depletion. Hydrophytic vegetation may grow in soils
31 at least periodically depleted of oxygen as a result of water saturation. Hydrophytic vegetation
32 might be able to grow only in wetlands (obligate wetlands vegetation) or may be found in upland
33 environments as well (facultative wetlands vegetation). Wetlands hydrology requires
34 permanent or temporary inundation of soils for at least one week during the growing season
35 and the resultant depletion of oxygen. All three conditions must be met for a site to be defined
36 as a wetland.
37

38 Wetlands serve a variety of functions within the ecosystem. Consideration of these
39 wetland functions is essential in the evaluation of potential impacts. Wetland functions and
40 values include the following:
41

- 42 • **Water quality preservation** – Wetlands help maintain and improve the water
43 quality of rivers, lakes, and estuaries. Because wetlands are located between
44 uplands and water resources, many wetlands can intercept runoff from the land
45 before it reaches open water. As runoff and surface water pass through, wetlands
46 remove or transform pollutants through physical, chemical, and biological processes.
47
- 48 • **Flood protection** – Wetlands help protect adjacent and downstream properties
49 from potential flood damage by receiving and temporarily storing water during
50 periods of high runoff or high flows in adjacent streams. Wetlands within and
51 upstream of urban areas are particularly valuable for flood protection because the
52 impervious surface in urban areas greatly increases the rate and volume of runoff,
53 thereby increasing the risk of flood damage.
54
- 55 • **Erosion control** – By virtue of their place in the landscape, riparian wetlands, salt

marshes, and marshes located at the margin of lakes and rivers protect shorelines and streambanks against erosion. Wetland plants hold the soil in place with their roots, absorb wave energy, and reduce the velocity of stream or river currents.

- **Biological productivity** – Wetlands are among the most productive ecosystems in the world. The unstable nature of many wetlands produces a great diversity of niches that, in turn, support a great diversity of plant and animal species. Numerous species of microbes, plants, insects, amphibians, reptiles, birds, fish, and other wildlife depend in some way on wetlands for at least part of their life cycles. Wetlands with seasonal hydrologic pulsing are the most productive. Wetland plants play an integral role in the ecology of the watershed by providing breeding and nursery sites, resting areas for migratory species, and refuge from predators.
- **Fish and wildlife habitat** – Diverse species of plants, insects, amphibians, reptiles, birds, fish, and mammals depend on wetlands for food, habitat, or temporary shelter. Many bird species use wetlands as a source of food, water, nesting material, or shelter. Migratory waterbirds rely on wetlands for staging areas, resting, feeding, breeding, or nesting grounds.
- **Cultural value** – Wetlands have archaeological, historical, and cultural values. Societies traditionally have formed along bodies of water, and artifacts found in wetlands provide information about these societies.
- **Aesthetic value** – Historically, painters and writers have used wetlands as their subject matter. Today, such artists are often joined by others with cameras, camcorders, and binoculars.
- **Economic value** – More than half of all adults in the United States hunt, fish, birdwatch, or photograph wildlife, spending a total of \$59.5 billion annually (OTA 1993). Waterfowl hunters alone spend more than \$600 million annually to harvest wetland-dependent birds (OTA 1993).
- **Scientific value** – Scientists value the processes of wetlands individually, particularly the role of wetlands in the global cycles of carbon, nitrogen, and water. Many scientists consider the removal of carbon dioxide from the atmosphere the most valuable function of wetlands (OTA 1993). Carbon sequestration is thought to be an important process in reducing the greenhouse effect and the threat of global warming.

Wetlands regulated under the *Clean Water Act of 1977* generally include swamps, marshes, bogs, and similar areas. The Hanford Site has a number of cribs, trenches, and cooling water ponds, a few of which support diverse wetland communities. Because these features serve waste water treatment or cooling water functions, they are not regulated as wetlands under the *Clean Water Act of 1977* and are not addressed in the scope of this assessment.

Wetlands on the Hanford Site have been identified from several sources, including the *National Wetlands Inventory* maps (USFWS 1976), *Priority Habitats & Species and Natural Heritage Data (Maps)* (WDFW 1993), and *Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern* (PNL 1993c). Wetlands on the Hanford Site have not been formally delineated, but most Hanford Site wetlands are found in poorly developed riparian zones along the Columbia River and in association with irrigation runoff in the Wahluke Slope geographic area. Because of strong currents, rocky substrate, and often widely fluctuating water levels, the Columbia River supports a poorly developed riparian vegetation community. Other wetlands present on the Hanford Site include several springs and ephemeral seeps on the ALE

1 Reserve geographic area.

2
3 Columbia yellowcress, which is a State of Washington endangered species, occurs in
4 wetlands along the Hanford Reach of the Columbia River. Pacific Northwest National
5 Laboratory biologists recently found 18 separate groups of Columbia yellowcress along the
6 shoreline of the 300 Area (WHC 1993). This species is usually found near the water line and is
7 often submerged during periods of high water.
8
9

10 **C.2 Potential Impacts on Floodplains and Wetlands**

11
12 The following discussion of the proposed action evaluates potential impacts to wetlands
13 and floodplains on the Hanford Site that could be associated with land-use designations under
14 each alternative. The discussion is organized by geographic areas as defined for the Hanford
15 Site in the *Final Report of the Hanford Future Site Uses Working Group* (FSUWG 1992) (except
16 that the Columbia River and Reactors on the River geographic areas defined in the final report
17 have been combined as the Columbia River Corridor geographic area), and is followed by a
18 summary of impacts for each alternative. This organization takes advantage of similarities in
19 land-use designations across alternatives for some geographic areas.
20

21 The Columbia River and Yakima River floodplains occur on the Hanford Site
22 (Figure C-1). The floodplain associated with the Columbia River occurs along the entire length
23 of the Hanford Reach and includes many of the islands in the river. A small portion of the
24 Yakima River floodplain intersects the southern edge of the Hanford Site where State Highway
25 240 crosses onto the Site. A probable maximum floodplain associated with Cold Creek and a
26 tributary, Dry Creek, has also been identified (Figure C-2). These creeks are ephemeral
27 streams within the Yakima River drainage system that drain areas to the west of the Hanford
28 Site and cross the southern portion of the Hanford Site toward the Yakima River. Surface flow,
29 when it occurs in Cold Creek and Dry Creek, infiltrates rapidly and disappears into the surface
30 sediments in the western portion of the Hanford Site. The natural and beneficial functions of
31 the floodplains could be adversely affected by activities that might occur within the floodplains
32 of Cold Creek, the Columbia River, or the Yakima River under certain land-use designations.
33

34 Wetlands on the Hanford Site are associated with the Columbia River, irrigation runoff,
35 and irrigation water wasteways from the Wahluke Slope; and riparian zones associated with
36 spring-fed streams on the ALE Reserve (Figure C-3). Many of the beneficial wetland functions
37 could be adversely affected by activities that might occur under certain land-use designations.
38

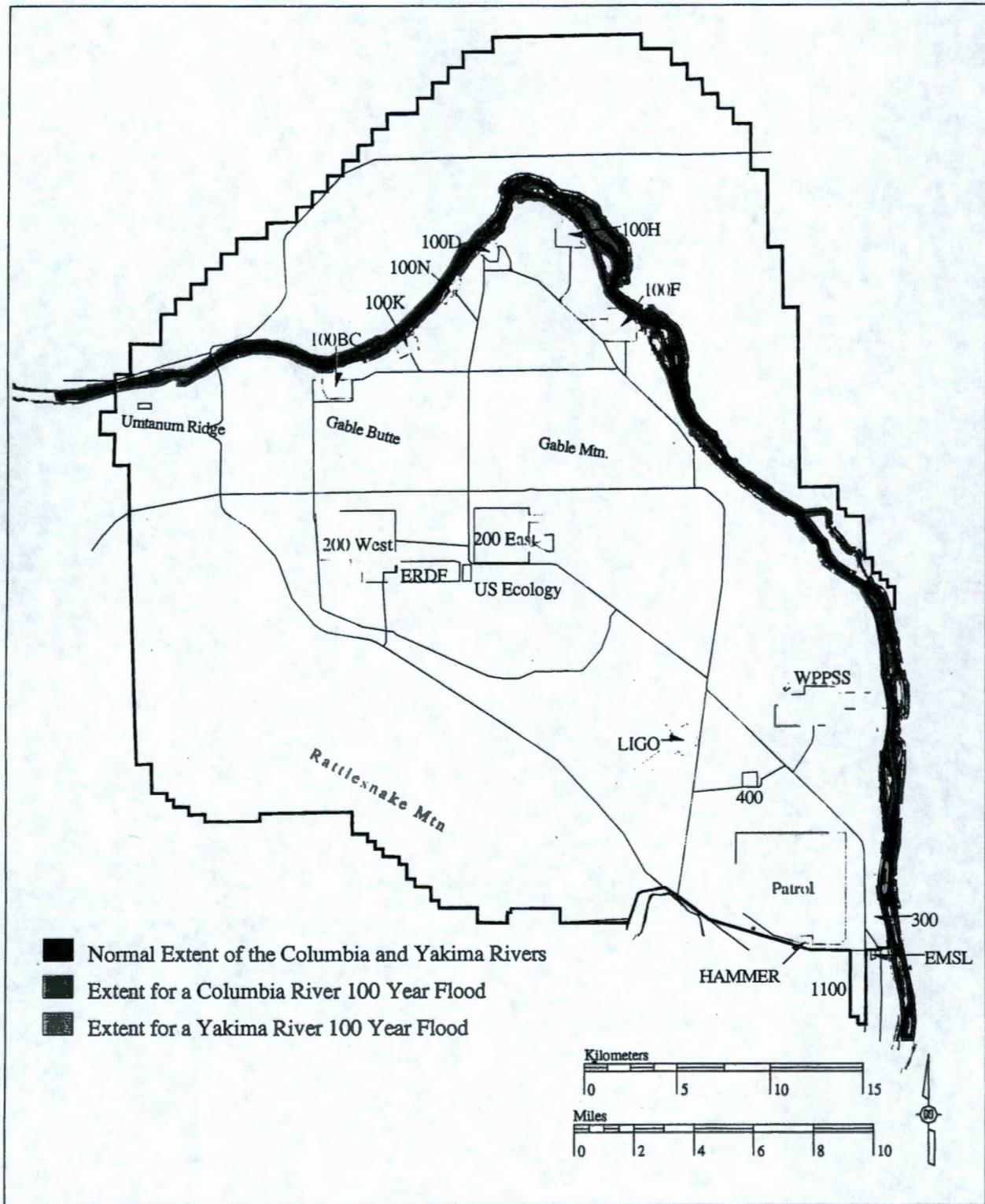
39 **C.2.1 No-Action Alternative**

40
41 Under the No-Action Alternative, impacts to wetlands and floodplains in the ALE
42 Reserve would be minimal. The area is presently managed in a way similar to a Preservation
43 designation. This management is anticipated to continue into the future. However, in the
44 absence of a formal designation, proposals to develop parcels located in the ALE Reserve
45 could be considered.
46

47 The USFWS would manage the Wahluke Slope as the Saddle Mountain National
48 Wildlife Refuge (similar to Preservation) and the Wahluke Wildlife Recreation Area (similar to
49 Conservation). Impacts to wetlands and floodplains in the Wahluke Slope geographic area
50 would be minimal as long as these areas continue to be managed in similar ways.

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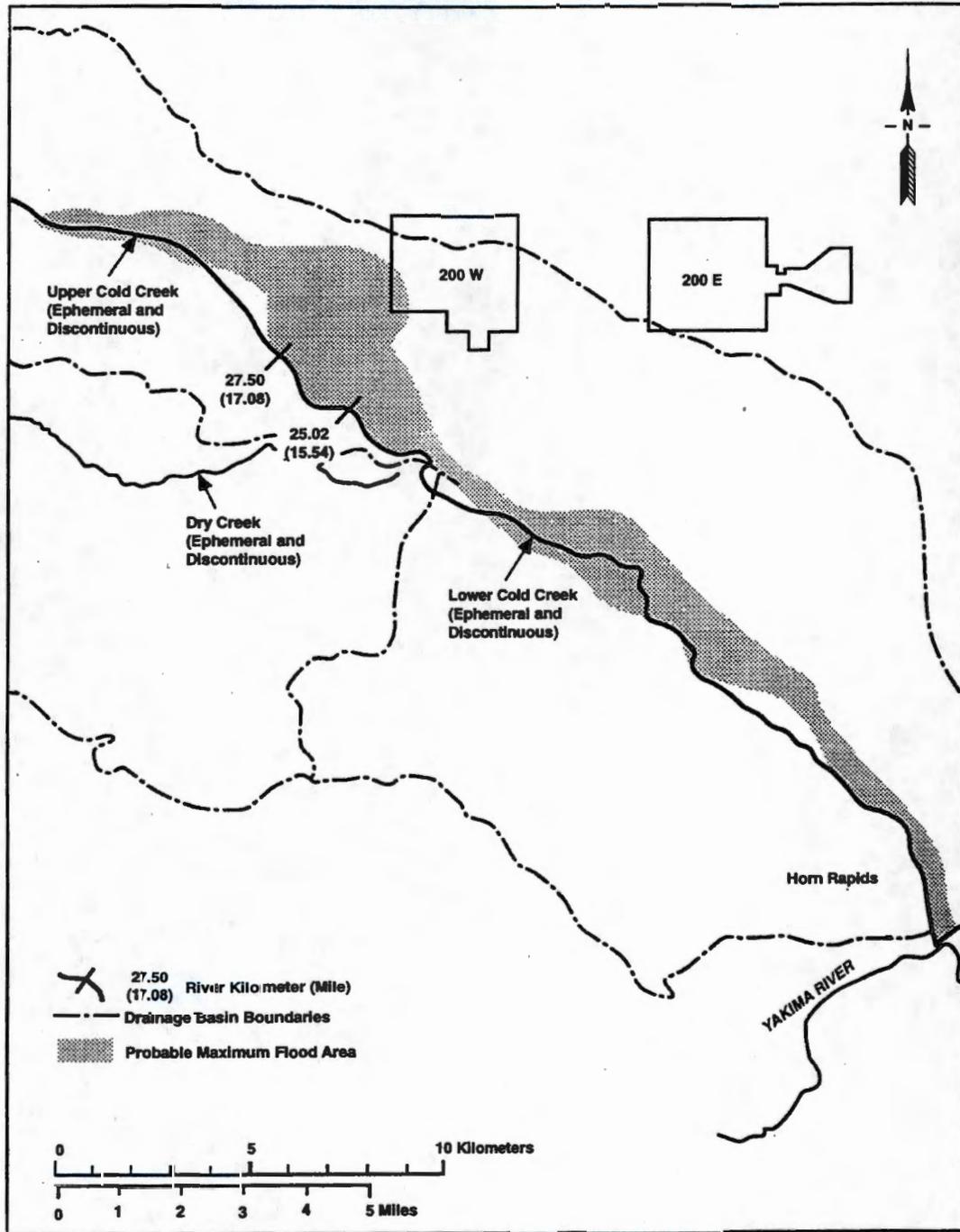
Figure C-1. 100-Year Floodplain of the Columbia and Yakima Rivers.



Database: 12-NOV-1998
BHLrpp 04/22/96 clup/flood3.aml

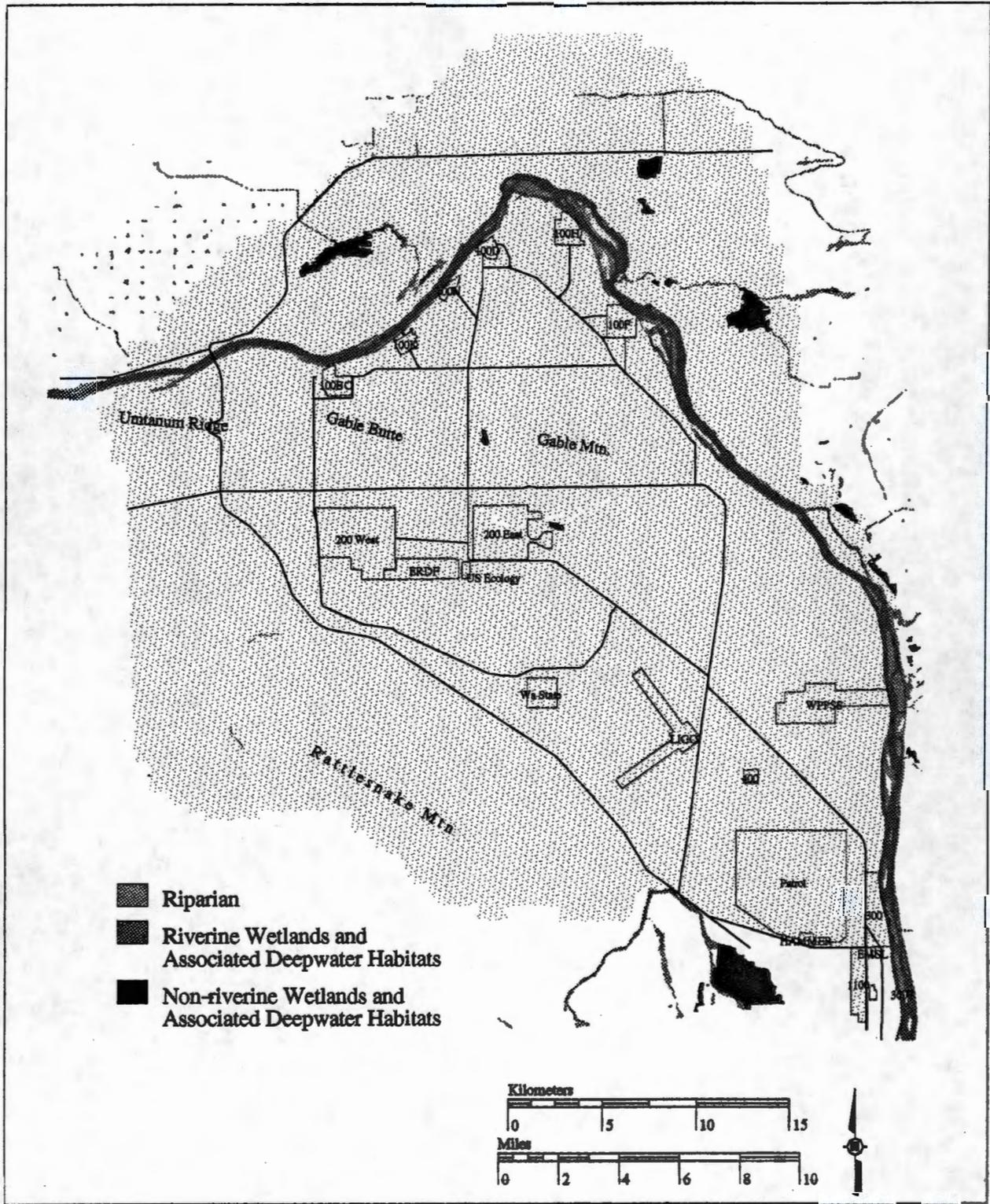
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Figure C-2. Extent of the Probable Maximum Flood in the Cold Creek Area.



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Figure C-3. Wetlands and Deep Water Habitats of the Hanford Site.



1 The No-Action Alternative would also maintain the status quo for the Columbia River
2 Corridor. The river could be used for recreation, but access to the islands would not be
3 permitted.
4

5 The Central Plateau would continue to be used for waste management (Industrial-
6 Exclusive use) under the No-Action Alternative. Although disturbance of wetlands and
7 development of floodplains would be anticipated to be high with this land-use, wetlands and
8 floodplains are essentially absent in this area. The lack of wetlands and floodplains is a primary
9 consideration in designating the area for Industrial-Exclusive land use.
10

11 The No-Action Alternative does not include any particular land-use designations for the
12 remainder. All areas could potentially be developed if appropriate uses were identified in the
13 future. Floodplains and wetlands along the Columbia River could be impacted by future
14 development.
15

16 **C.2.2 Preferred Alternative**

17
18 Although the Preferred Alternative would designate an area immediately south of State
19 Highway 240 for Conservation (Mining) to allow for possible development of a quarry within the
20 ALE Reserve, no wetlands are located in this area. No impacts to wetlands or floodplains are
21 anticipated to occur under the Preservation designation. The area designated for Conservation
22 (Mining) is adjacent to or located within the Cold Creek probable maximum floodplain, and
23 infrastructure developed to support a quarry site and transport materials would cross the
24 floodplain. This infrastructure could cause some small impacts to floodplain function because
25 the infrastructure could interfere with movement of water under flood conditions.
26

27 The Wahluke Slope is designated for Preservation under the Preferred Alternative. The
28 Preservation designation is applied to all wetland and floodplain areas within this area. Impacts
29 to wetlands on the Wahluke Slope would be minimal.
30

31 Land-use designations along the Columbia River Corridor would include Preservation,
32 Conservation (Mining), Low-Intensity Recreation, and High-Intensity Recreation. The
33 Preservation designation would be applied to the river islands, and the Conservation (Mining)
34 designation would encompass lands surrounding the surplus reactors, but not near the River.
35 Low-Intensity Recreation designations apply to places with existing boat launches that are not
36 presently available for public use, to the river itself, and to an area along the Columbia River
37 west of the B Reactor. High-Intensity Recreation is associated with the B Reactor, which may
38 be designated as a National Historic Landmark and open to tourists.
39

40 Under the High- and Low-Intensity Recreation land-use designations, impacts to
41 floodplains would be minimal. However, increased use of recreational watercraft could lead to
42 damage to wetlands. High-Intensity Recreation would lead to wetland damage due to intensive
43 use of recreational watercraft, potential off-road vehicle traffic, and foot traffic. Wetlands that
44 would be adversely impacted would be those in the vicinity of the areas designated for High-
45 Intensity Recreation, with impacts diminishing with distance from the high use areas.
46

47 Increased activity in the river under the Conservation designation would also potentially
48 lead to damage to wetlands associated with the Columbia River riparian zone. Impacts to
49 wetlands and floodplains associated with the Columbia River are influenced by the land-use
50 designations adjacent to the river, with more aggressive use of the land leading to a greater
51 degree of damage.
52

53 The Preferred Alternative would designate the Central Plateau for Industrial-Exclusive
54 use. No wetlands or floodplains are present within the Central Plateau and no impacts would
55 be anticipated. The lack of wetlands or floodplains in this geographic area is a primary

1 consideration in designating the area for Industrial-Exclusive land use.

2
3 The Preferred Alternative would designate portions of the remainder of the Hanford Site
4 for Preservation, Conservation (Mining), Industrial use, Low- and High-Intensity Recreation, and
5 Research and Development. Areas within the Cold Creek floodplain would be designated for
6 Conservation (Mining) and Research and Development. Areas within the Yakima River
7 floodplain would be designated for Industrial use and Research and Development. These
8 activities are anticipated to have little impact on the floodplain because development would be
9 minimal and the affected areas are small. Areas along the Columbia River designated for Low-
10 and High-Intensity Recreation could adversely impact wetlands in the vicinity of the land
11 designated for these uses. No wetlands are located within the areas designated for Industrial
12 use.

13 14 **C.2.3 Alternative One**

15
16 Alternative One would designate the majority of the Hanford Site as Preservation
17 consistent with the expansion of the Saddle Mountain National Wildlife Refuge. No impacts to
18 wetlands or floodplains are anticipated to occur under the Preservation designation.

19
20 Alternative One would designate land along the Columbia River Corridor as
21 Preservation, and for Low- and High-Intensity Recreation. The Preservation designation would
22 apply to small upland areas, the river islands, and land adjacent to the river. Low-Intensity
23 Recreation designations apply to places with existing boat launches that are not presently
24 available for public use, to the river itself, and to an area along the Columbia River west of the B
25 Reactor. High-Intensity Recreation is associated with the B Reactor, which may be designated
26 as a National Historic Landmark and open to tourists.

27
28 Under the High- and Low-Intensity Recreation land-use designations, impacts to
29 floodplains would be low. High-Intensity Recreation could lead to wetland damage due to
30 intensive use of recreational watercraft, potential off-road vehicle traffic, and foot traffic.
31 Increased activity in the river under the Conservation designation could potentially lead to
32 damage to wetlands associated with the Columbia River riparian zone. Impacts to wetlands
33 and floodplains associated with the Columbia River are influenced by the land-use designations
34 adjacent to the river, with more aggressive use of the land leading to a greater degree of
35 damage. Alternative One designates all land on both sides of the Columbia River for
36 Preservation, with the exception of a small area designated for High-Intensity Recreation in the
37 vicinity of the B Reactor. Impacts to wetlands and floodplains associated with the Columbia
38 River would be minimal under this alternative.

39
40 Alternative One would designate the Central Plateau for Industrial-Exclusive use. No
41 wetlands or floodplains are present within the Central Plateau and no impacts would be
42 anticipated. The lack of wetlands or floodplains in this geographic area is a primary
43 consideration in designating the area for Industrial-Exclusive use.

44
45 Alternative One includes an area designated for Industrial use in the South 600 Area.
46 No wetlands or floodplains are included in areas designated for this use pattern. Impacts to
47 floodplains and wetlands under this alternative would be minimal or nonexistent.

48 49 **C.2.4 Alternative Two**

50
51 Wetland areas on the ALE Reserve and the Wahluke Slope are designated for
52 Preservation under Alternative Two. Under this designation, no adverse impacts to the
53 wetlands or floodplains would be anticipated. The Preservation designation would provide
54 protection for the wetlands and floodplains from disturbance and development. All lands along
55 the Columbia River would also be designated for Preservation under Alternative Two except for

1 the area associated with the B Reactor, which is designated for High-Intensity Recreation.
2 Impacts to wetlands and floodplains associated with the river would be minimal.
3

4 Alternative Two would designate the Central Plateau for Industrial-Exclusive use. No
5 wetlands or floodplains are present within the Central Plateau and no impacts would be
6 anticipated. The lack of wetlands or floodplains in this geographic area is a primary
7 consideration in designating the area for Industrial-Exclusive land use.
8

9 Alternative Two includes an area designated for Industrial use and Preservation within
10 the "All Other Areas" geographic area. No areas within wetlands or floodplains are designated
11 for this use pattern. Impacts to floodplains and wetlands under this alternative would be
12 minimal or nonexistent.
13

14 **C.2.5 Alternative Three**

15
16 The ALE Reserve would be designated for Conservation (Mining) areas under
17 Alternative Three, including wetland and floodplain areas. Impacts to wetlands and floodplains
18 that could occur under a Conservation (Mining) designation are anticipated to be similar to
19 impacts under the Preservation designation. Mining activities would probably be similar to
20 quarry operations and would involve a quarry site operation. These operations would be
21 localized and would be anticipated to have minimal impact on floodplains.
22

23 Alternative Three designates portions of the Wahluke Slope for Agriculture,
24 Conservation (Mining and Grazing), and High-Intensity Recreation. Wetlands within the
25 Wahluke Slope are located in areas designated for Agriculture or Conservation (Mining and
26 Grazing). Up to 261 ha (645 ac) of wetlands and associated deep water habitats could be
27 directly and adversely impacted by Agriculture. Impacts to the remaining 739 ha (1,825 ac) of
28 wetlands in the Wahluke Slope could also include non-point source runoff of agricultural
29 chemicals, and impacts to wetlands due to runoff are anticipated to be minimal. Wetlands in
30 this area exist as a result of irrigation runoff from agricultural areas surrounding the Wahluke
31 Slope. The Agriculture designation also applies to land within the "Red Zone Area" designated
32 for no irrigation. If irrigated agriculture were ultimately developed in this area, increased
33 slumping of the White Bluffs would be expected to occur. This increased slumping would
34 adversely affect existing wetlands and riparian habitat along the Columbia River, and would
35 cover any floodplain in the area of the slump.
36

37 The Columbia River would continue to be used as a recreational river with additional
38 development associated with the High-Intensity Recreation designation. The Low-Intensity
39 Recreation designation under Alternative Three applies to a trail enabling access to the river
40 from State Highway 24 to the north of the river and running along the river. Although portions
41 of this trail would be located within the Columbia River floodplain, impacts to the floodplain
42 would be minimal. A small area adjacent to the Columbia River is designated for High-Intensity
43 Recreation and this designation would be anticipated to have a potential for adverse impacts to
44 the 5 ha (12 ac) of riparian habitat in the area designated for High-Intensity Recreation.
45

46 Under the High- and Low-Intensity Recreation designations, impacts to floodplains
47 would be minimal. However, increased use of recreational watercraft could lead to damage to
48 wetlands. High-Intensity Recreation could lead to wetland damage due to intensive use of
49 recreational watercraft, potential off-road vehicle traffic, and foot traffic. Wetlands that could be
50 adversely impacted would be those in the vicinity of the areas designated for High-Intensity
51 Recreation, with impacts diminishing with distance from the high use areas.
52

53 Alternative Three would designate the Central Plateau for Industrial-Exclusive use. No
54 wetlands or floodplains are present within the Central Plateau and no impacts would be
55 anticipated. The lack of wetlands or floodplains in this geographic area is a primary

1 consideration in designating the area for Industrial-Exclusive use.

2
3 Alternative Three would designate areas within the remainder of the Hanford Site for
4 Conservation (Mining), Industrial Use, Research and Development, Low-Intensity Recreation,
5 and High-Intensity Recreation. The Cold Creek floodplain overlaps with areas designated for
6 Conservation (Mining), Research and Development, and High-Intensity Recreation; the Yakima
7 River floodplain overlaps an area designated for High-Intensity Recreation. These land-use
8 designations, especially High-Intensity Recreation, could adversely impact these floodplains.
9

10 **C.2.6 Alternative Four**

11
12 Wetland areas on the ALE Reserve would be designated for Preservation. No impacts
13 to wetlands or floodplains are anticipated to occur under the Preservation designation. An area
14 immediately south of State Highway 240 would be designated for Conservation (Mining) to
15 allow for possible development of a quarry. The area designated for Conservation (Mining)
16 under Alternative Four is adjacent to or located within the Cold Creek probable maximum
17 floodplain, and infrastructure developed to support a quarry site and transport materials would
18 cross the floodplain. This infrastructure could cause some small impacts to floodplain function
19 because the infrastructure could interfere with movement of water under flood conditions.
20 Potential impacts to wetlands and floodplains in the ALE Reserve would be similar to impacts
21 under the Preservation designation. Mining activities would probably be similar to quarry
22 operations and would involve a quarry-site operation that would have minimal impact on the
23 Cold Creek floodplain.
24

25 Alternative Four would designate the Wahluke Slope and all lands on both sides of the
26 Columbia River for Preservation, and for High- and Low-Intensity Recreation. Impacts to
27 wetlands and floodplains in the Columbia River Corridor geographic area would be minimal, and
28 no adverse impacts to the wetlands or Columbia River floodplain on the Wahluke Slope
29 geographic area would be anticipated. The Preservation designation would provide protection
30 for the wetlands and floodplains from disturbance and development.
31

32 Alternative Four would designate the Central Plateau for Industrial-Exclusive use. No
33 wetlands or floodplains are present within the Central Plateau and no impacts would be
34 anticipated. The lack of wetlands or floodplains in this geographic area is a primary
35 consideration in designating the area for Industrial-Exclusive use.
36

37 Alternative Four would designate the majority of the land in the remainder of the Hanford
38 Site for Preservation and for Conservation. Areas would also be designated for Research and
39 Development and for Industrial use. All areas within the boundaries of wetlands and floodplains
40 would be designated for Preservation or Conservation, and impacts to these areas would be
41 negligible.
42

Appendix D — Quarry Sites, Haul Roads, Railroads, and Cap Description

The need for mineral resources in support of Hanford Site remediation will likely require development or enlargement of quarries. One possible remediation technology that could be selected to isolate harmful substances from humans and the environment is construction of surface caps over the waste sites. Surface caps generally consist of successive layers of materials such as basalt riprap, sand, gravel, geotextile membranes, and asphalt. Materials required for cap construction could be obtained from sources located on or off the Hanford Site. Appendix D provides a description of a reference cap design (Section D.1) and identifies potential sources of materials required for cap construction (Section D.2). The reference cap provides a conservative estimate of materials that could be required for cap construction. Other cap designs that would require less material would be evaluated during the remediation process for each specific waste site. Quarries located on the Hanford Site would be constructed in areas with a designated land use that accommodates mining activities.

Two prospective quarries have been identified as potential sources of materials for construction of surface caps over waste sites: McGee Ranch and Pit 30. McGee Ranch would serve as a source of fine materials, and Pit 30 would provide coarser aggregates.

In addition to the above quarries, several potential sources of basalt that may be required for barrier construction have been tentatively identified and evaluated in an engineering study (BHI 1995). The basalt quarry would provide material for riprap and possibly for asphalt and asphalt-base layers of the reference barrier. Ten locations on or near the Hanford Site have been evaluated as candidate basalt quarry sites. Evaluations were based on qualifying criteria (i.e., proximity to the 200 Areas on the Hanford Site, basalt availability, suitability of basalt, and threatened and endangered species impacts) and engineering criteria (i.e., haul distance, safety, expansion potential, and land reclamation potential). Other important factors used in determining the suitability of a site for quarry development are the significant cultural, archaeological, and historical resources that might be present.

Cultural resource surveys indicate that the most favorable sites for basalt quarry development from an engineering perspective are the least favorable for development from a cultural resources perspective. The most favorable sites from an engineering perspective exhibit features valued by American Indian tribes for traditional cultural and religious reasons. Sites that are less favorable for quarry development from an engineering perspective typically consist of near-surface basalt sources that do not have the commanding view of the surrounding terrain that is valued by tribal members for traditional cultural and religious uses. Factors other than cultural resources (e.g., excavation requirements, transportation cost, and reclamation potential) make these near-surface basalt sources less desirable from an engineering perspective.

D.1 Reference Cap Design

To estimate the quantity of materials required for cap construction, a conservative reference cap design was used in the analysis. For additional conservatism, capping was assumed to be the selected remedy for most Hanford waste sites. Other cap designs involving less material and, therefore, having lower construction and environmental costs, would be considered in the evaluation of remediation technologies for use at each specific waste site. The reference cap design provides the most conservative estimates of materials that would be required.

1 The reference cap design, commonly referred to as the Hanford Cap or Hanford Barrier,
2 is a composite cap intended to protect waste sites from human intrusion, burrowing animals,
3 root penetration, and water infiltration. This reference cap was designed specifically for
4 conditions at the Hanford Site (i.e., a desert environment). The Hanford Cap consists of ten
5 layers divided into three zones (from top to bottom): a water retention and evapotranspiration
6 zone, a capillary break and biotic intrusion zone, and a low-permeability moisture barrier.
7

8 The water retention and evapotranspiration zone would consist of a 100-cm (39-in.)-
9 thick layer of silt and pea gravel over a 100-cm (39-in.)-thick layer of silt. The top layer of silt
10 and pea gravel would be seeded with various grasses. The silt and pea gravel layer would
11 provide a growing medium for vegetation as well as some resistance to wind and water erosion.
12 Water from precipitation would be held in this 200-cm (78-in.)-thick zone. The plants
13 established on top of this zone would extract water from the soil and, through
14 evapotranspiration, return moisture to the atmosphere.
15

16 The capillary break and biotic intrusion zone would be constructed of coarser materials
17 than the water retention zone and would consist of a sand filter, a gravel filter, and a layer of
18 crushed basalt. The capillary break would minimize water infiltration because moisture would
19 not flow into the larger gaps found in the coarser material until water pressure in the overlying
20 zone increased to nearly atmospheric pressure. The upper, fine-textured water retention zone
21 would need to be nearly saturated before moisture would break through into the underlying
22 coarse material. A geotextile filter would be located at the interface between the water retention
23 zone and the capillary break. The geotextile filter would impede downward migration of fine-soil
24 into the underlying sand filter, thereby maintaining the textural contrast that creates the capillary
25 break. The lack of moisture in the basalt layer would discourage root penetration. The larger
26 materials, particularly the crushed basalt, would provide a barrier to burrowing animals, root
27 penetration, and inadvertent human intrusion.
28

29 The low permeability moisture barrier would consist of a 30-cm (11.7-in.) crushed rock
30 or gravel drainage layer, a 10-cm (3.9-in.) asphaltic concrete layer, and a base course. This
31 zone would collect moisture that penetrated the upper layers and divert the moisture away from
32 the buried wastes that underlie this last zone. The low permeability moisture barrier would be
33 situated on top of the existing interim soil cover.
34
35

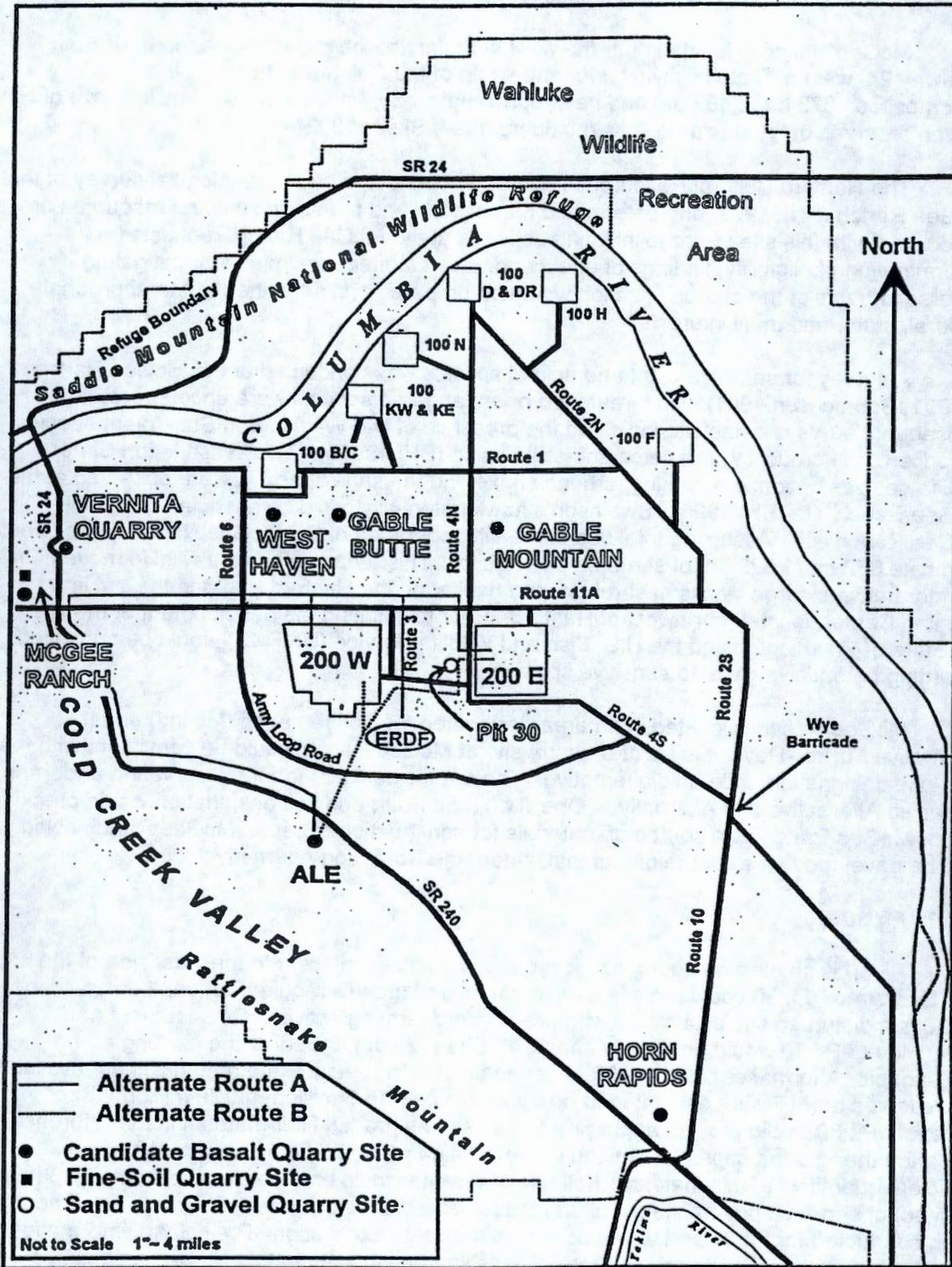
36 **D.2 Quarry Sites**

37

38 The following sites have been identified as preferred sources of cap materials (see
39 Figure D-1) based on engineering studies and other available information (BHI 1995;
40 Lindberg 1994; Skelly 1992). Final selection of quarry sites would depend on the amounts and
41 types of materials required, as determined on a site-specific basis. For example, use of a
42 modified *Resource Conservation and Recovery Act of 1976* (RCRA) C cap would require
43 minimal use of basalt and could make development of a basalt quarry unnecessary. Quarries
44 would be developed only in areas with future land-use designations consistent with mining
45 activities. The following sections discuss potential quarry sites and the land-use designations
46 for those sites under each alternative. Upon approval of the Record of Decision for the *Hanford*
47 *Comprehensive Land-Use Plan Environmental Impact Statement* (HCP EIS), development of a
48 quarry in an area without a land-use designation consistent with mining activities would require
49 changing the land-use designation for that area through the *National Environmental Policy Act*
50 *of 1969* (NEPA) process.
51

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Figure D-1. Preferred Sources of Cap Materials.



1 **D.2.1 McGee Ranch**

2
3 McGee Ranch has been identified as the preferred quarry site for fine-grained soils
4 potentially used in construction of caps for closure of waste sites at the Hanford Site.
5 Fine-grained soils might be used as topsoil for the cap.
6

7 McGee Ranch is located near the west boundary of the Hanford Site, north of State
8 Highway 24, west of State Highway 240, and south of the Columbia River. The site
9 encompasses 873 ha (2,182 ac) and has approximately 36.1 million m³ (47.3 million yd³) of
10 proven reserves of fine-textured soils (Lindberg 1994; Skelly 1992).
11

12 The Hanford Cultural Resources Laboratory conducted an archaeological survey of the
13 McGee Ranch (PNL 1992) and determined that historic and prehistoric cultural resources are
14 associated with this site. Prior to initiating activities at the McGee Ranch, requests for
15 determination of eligibility, findings of effect and adverse effect, and plans for mitigating
16 adverse impacts of the proposed action would be prepared and submitted to the appropriate
17 Federal, state, and tribal interests.
18

19 A survey for sensitive plant and animal species was conducted at the McGee Ranch site
20 in 1991 (Sonnichsen 1991). No threatened or endangered species were encountered.
21 Subsequent surveys of the site indicated the presence of two Washington State plant species
22 of concern, the crouching milkvetch and scilla onion (BHI 1995b). Two Washington State
23 wildlife species of concern, the loggerhead shrike and the sage sparrow, were observed at the
24 McGee Ranch site (BHI 1995). Swainson's hawk potentially could be associated with the
25 McGee Ranch site. Assuming total use of the site, operation of the McGee Ranch quarry would
26 eradicate 652 ha (1,629 ac) of shrub-steppe habitat. This area serves as a wildlife movement
27 corridor between large blocks of shrub-steppe habitat on the Hanford Site and the Yakima
28 Training Center, located northwest of Hanford. Prior to initiating the development of the site,
29 the State of Washington and the U.S. Fish and Wildlife Service (USFWS) would be consulted
30 regarding potential impacts to sensitive species.
31

32 McGee Ranch is located in an area designated for Conservation (Mining) under
33 Alternative Three. Development of a quarry site at McGee Ranch would be consistent with the
34 land-use designation under this alternative. The area is designated for Preservation under the
35 Preferred Alternative and Alternatives One, Two, and Four; and this designation would preclude
36 use of McGee Ranch as a source of materials for construction of caps. McGee Ranch could
37 also be developed as a source of materials under the No-Action Alternative.
38

39 **D.2.2 Pit 30**

40
41 Pit 30 is an existing quarry site located immediately adjacent to the west side of the
42 200 East Area. Pit 30 could provide coarse sands and gravels required for cap construction.
43 Pit 30 is a disturbed site associated with pre-Hanford farming activity. Development and
44 expansion of Pit 30 would potentially impact 172 ha (426 ac), including the existing 49-ha
45 (120-ac) pit. A formal calculation of total reserves of coarse aggregate material is not available,
46 but reserves at Pit 30 are estimated to be approximately 15.3 million m³ (20 million yd³) of
47 material. Pit 30 would provide aggregate to be used as graded filter material in the reference
48 cap and other graded caps. Expansion of the existing pit would be necessary to provide
49 sufficient quantities of this material. Full use of the site would eradicate approximately 138 ha
50 (345 ac) of shrub-steppe habitat. Cultural resource and sensitive species surveys have not
51 been conducted for Pit 30 and would be required prior to excavation. Preliminary information
52 received from the USFWS and the State of Washington indicate that there are no sensitive
53 species associated with this site. Completion of these surveys and consultation with the State
54 of Washington and the USFWS would be required prior to initiating activity.
55

1 Pit 30 is located in an area designated for Industrial-Exclusive use under all alternatives.
2 Obtaining materials for construction of caps over waste sites would be consistent with this land-
3 use designation.
4

5 **D.2.3 Potential Basalt Quarry Sites**

6

7 Candidate quarry sites have been evaluated on the basis of qualifying criteria and
8 engineering criteria (BHI 1995). A broad range of possible quarry sites, including seven onsite
9 candidate quarries and three offsite privately operated quarries, were addressed. Candidate
10 quarries included exposed basalt outcrops and basalt sources at or slightly below grade. Sites
11 evaluated as potential basalt quarries were Vernita Quarry, McGee Ranch, the
12 Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve) Site, Horn Rapids Site, Gable
13 Mountain Site, Gable Butte Site, West Haven Site, Section 9 Quarry, DeAtley Quarry, and
14 Mahaffey Quarry. (The last three sites are privately owned and operated off the Hanford Site.)
15

16 Factors considered in the evaluation were categorized into two groups:
17 (1) environmental, safety, and security factors; and (2) engineering and economic factors.
18 Qualifying criteria included proximity to the 200 Areas on the Hanford Site (Central Plateau),
19 basalt availability, suitability of basalt, and threatened and endangered species impacts.
20 Engineering criteria included haul distance, safety, expansion potential, and land reclamation.
21 Detailed descriptions of these criteria and evaluations are provided in the *Site Evaluation*
22 *Report for Candidate Basalt Quarry Sites* (BHI 1995).
23

24 Historical, archaeological, and cultural resource impacts were not used as qualifying
25 criteria because to date, only a portion of each candidate Hanford quarry has been surveyed
26 and the database is incomplete. These resources would be fully assessed, evaluated, and
27 mitigated, if necessary, prior to beginning any quarry operations. Mitigation would most likely
28 be undertaken in accordance with a Memorandum of Agreement developed in coordination with
29 the U.S. Department of Energy, Richland Operations Office (RL), the State Historic
30 Preservation Office, and Tribal governments.
31

32 Development of a surface (or near-surface) basalt site would be comparable to a typical
33 open-pit mine. A site occupying approximately 200 ha (500 ac) would need to be developed to
34 a depth of approximately 25 m (80 ft) to satisfy the potential materials need.
35

36 Ecological surveys for threatened or endangered species were conducted at each
37 Hanford Site candidate quarry. No Federal or state threatened or endangered species were
38 observed at these sites, although several Federal and state species of concern were observed.
39 Ecological surveys were not conducted at the three privately operated commercial quarries.
40

41 **D.2.3.1 Vernita Quarry.** Vernita Quarry is located off the east side of State Highway 24 near
42 Vernita Bridge and has been identified as a suitable source to supply riprap required for use in
43 constructing protective surface caps at the Hanford Site. NEPA documentation, including a
44 survey for threatened or endangered species and a cultural resource survey, was prepared to
45 support removing a small quantity of basalt from this quarry, and approximately 10,700 m³
46 (14,000 yd³) of riprap was removed in March 1994. This basalt was used to construct a
47 prototype Reference (Hanford) Cap over the B-57 crib in the 200-BP-1 Operable Unit. Vernita
48 Quarry could be developed by expanding the existing quarry or by developing a new quarry in
49 the vicinity.
50

51 The quarry is located in an extensive basalt outcrop and a considerable volume of basalt
52 exists outside of the area identified for quarry development. Initially, a 45-ha (110-ac) parcel
53 would be developed. This parcel could yield 11.9 million m³ (15.6 million yd³) of loose riprap.
54 Additional basalt could be obtained at this quarry by deeper excavation or by extending the
55 quarry deeper into the basalt bench. Additional overburden per unit area might be encountered

1 on parts of this outcrop, if the quarry were to be expanded beyond the identified boundaries.
2 The potential volume of useable basalt makes expansion of this site feasible, and the Vernita
3 Quarry Site could supply a sufficient quantity of basalt for cap construction.
4

5 Vernita Quarry is located in an exposed bench that could be reclaimed fairly
6 successfully from a physical and topographic perspective. The bench would be translocated
7 into the original outcrop and, when the quarry operations were complete, an exposed bench
8 would remain. The approach to the new bench could be graded to provide a natural transition
9 from the surrounding terrain. Revegetation would be used to further enhance the transition
10 between undisturbed and disturbed areas.
11

12 Two Washington State plant species of concern, the crouching milkvetch and the
13 stalked-pod milkvetch, were observed during a survey at the Vernita Quarry Site. A list of all
14 flora and fauna species observed at this site and other potential sites during the ecological
15 surveys is included as Appendix C in the *Site Evaluation Report for Candidate Basalt Quarry*
16 *Sites* (BHI 1995).
17

18 Vernita Quarry is located in an area designated for Conservation (Mining) in the
19 Preferred Alternative, and Conservation (Mining) in Alternative Three. Development of a quarry
20 at this site would be consistent with these land-use designations. Vernita Quarry is located in
21 an area designated for Preservation under Alternatives One, Two, and Four, and development
22 of the quarry would not be consistent with this land-use designation. Vernita Quarry could be
23 expanded under the No-Action Alternative.
24

25 **D.2.3.2 McGee Ranch.** A near-surface basalt source exists on the interior north portion of the
26 McGee Ranch site, northwest of the McGee well. Another portion of McGee Ranch is a
27 potential quarry site for fine-textured soils required for cap construction and the same
28 infrastructure could support both the fine-soil quarry and the basalt quarry. Basalt
29 characteristics for this site are not well known because surfaces or benches are not exposed.
30 The formation exists as a knoll with approximately 15 to 30 m (50 to 100 ft) of vertical relief.
31 The thickness of the overburden is not known. The most likely scenario for developing a quarry
32 at this site would be to begin mining the east end of the ridge. Quarry development would
33 proceed to the west in blocks that span the width of the formation, while maintaining grade
34 above the 274 m (900 ft) contour level. If additional basalt was required, excavation would
35 proceed below this contour level. This potential quarry site consists of a 47 ha (116 ac) parcel.
36 Excavation of the site to the 274 m (900 ft) contour level would yield 15.3 million m³
37 (20 million yd³) of loose riprap.
38

39 The basalt knoll at McGee Ranch would be developed similarly to an exposed outcrop.
40 The reclaimed landscape would not blend with the surrounding landscape to the same degree
41 as the Vernita Quarry Site. The knoll has several drainages running lengthwise on either side,
42 which would be eliminated by removal of the basalt formation during quarry operations. A pit
43 would be created if the formation were mined below the grade of the surrounding landscape to
44 provide additional basalt materials. A revegetation program would help the quarry area partially
45 blend with the surrounding landscape and would camouflage the quarry.
46

47 Two Washington State plant species of concern (the crouching milkvetch and scilla
48 onion) and two Washington State wildlife species of concern (the loggerhead shrike and the
49 sage sparrow) were observed at the McGee Ranch site.
50

51 The McGee Ranch site is located in an area designated for Conservation (Mining) in
52 Alternative Three. Development of a quarry at this site would be consistent with this land-use
53 designation. The proposed quarry site is located in an area designated for Preservation under
54 the Preferred Alternative and Alternatives One, Two, and Four. Development of the quarry
55 would not be consistent with this land-use designation. McGee Ranch could be developed

1 under the No-Action Alternative.

2
3 **D.2.3.3 The Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve).** The
4 Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve) consists of near-surface basalt
5 located approximately 300 m (1,000 ft) south of State Highway 240 near Gate 116. This site
6 would be developed similar to an open-pit surface mine, with adequate buffer zones
7 surrounding the excavation to maintain safe side slopes.

8
9 The near-surface portion of the basalt formation covers a fairly limited area compared to
10 the other sites. The quantity of basalt at this site is large and expansion could probably be
11 accommodated through deeper excavation. However, further geologic surveys would need to
12 be conducted to verify the extent of this formation and the depth of overburden and weak
13 flow-top material, and to determine if a sufficient quantity of basalt could be obtained from the
14 ALE Reserve.

15
16 One Washington State plant species of concern (the stalked-pod milkvetch) and two
17 Washington State bird species of concern (the grasshopper sparrow and sage sparrow) were
18 observed at the ALE Reserve.

19
20 The ALE Reserve is located within an ecology reserve that, for the most part, has
21 remained untouched by large development activities and has been set aside for ecological
22 preservation and research. The proximity of a quarry to the ALE Reserve might result in
23 avoidance behavior or other disturbance by sensitive species and animals (e.g., mule deer and
24 elk). A large-scale basalt quarry does not fit historical or current use designations for the ALE
25 Reserve.

26
27 The ALE Reserve is located in an area designated for Conservation (Mining) in the
28 Preferred Alternative and Alternatives Three and Four. Development of a quarry at this site
29 would be consistent with this land-use designation. The ALE Reserve is located in an area
30 designated for Preservation under Alternatives One and Two. Development of the quarry would
31 be consistent with this land-use designation. Development of the quarry would not be
32 consistent with current management practices and would be a nonconforming use under the
33 No-Action Alternative.

34
35 **D.2.3.4 Horn Rapids Site.** A basalt outcrop and potential quarry area exists 900 m (3,000 ft)
36 north of the Horn Rapids Dam. Characteristics of this site are not well known because few
37 basalt benches are exposed. The flow top is relatively flat at the 152-m (500-ft) contour with
38 abundant scattered basalt rocks in places. Some vertical relief exists near the south end and
39 near the center on the west side of the outcrop, and these two locations might provide the most
40 suitable locations to begin quarry operations. Initial quarry development would probably involve
41 an 84-ha (207-ac) parcel.

42
43 The Horn Rapids site could be developed in a manner similar to development of the
44 basalt formation at Vernita. A well-developed and exposed bench is not present at the Horn
45 Rapids site, but vertical relief at the south end would enable development of a 9- to 12-m (30- to
46 40-ft) bench.

47
48 The near-surface source at the Horn Rapids site is fairly extensive and could
49 accommodate future expansion. Further geologic surveys would need to be conducted to verify
50 the extent of this formation and to determine if a sufficient quantity of basalt could be obtained
51 from the Horn Rapids site.

52
53 One Washington State wildlife species of concern (two pairs of long-billed curlew) was
54 observed at the Horn Rapids site.

1 The Horn Rapids site is located in an area designated for Research and Development in
2 the Preferred Alternative and Alternative Three. Development of a quarry at this site would not
3 be consistent with this land-use designation. The Horn Rapids site is located in an area
4 designated for Preservation under Alternatives One, Two, and Four. Development of the quarry
5 would not be consistent with this land-use designation. The site would be available for
6 development under the No-Action Alternative.
7

8 **D.2.3.5 Gable Mountain Site.** Gable Mountain is a prominent geologic feature north of
9 Route 11A and north-to-northeast of the 200 East Area. A small quarry already exists at this
10 site, and observation of exposed basalt indicates that a suitable quality of basalt exists
11 throughout the west end of Gable Mountain. The existing quarry on the west end of Gable
12 Mountain has the capacity to supply all basalt needs at the Hanford Site. The quarry would be
13 expanded by advancing eastward into the mountain. A considerable quantity of naturally
14 occurring talus slope material exists at Gable Mountain and could provide many thousands of
15 cubic meters of riprap. Also, several large piles (thousands of cubic meters) of human-made
16 riprap exist in the old quarry site. Development of a quarry at the Gable Mountain site would
17 begin at the far west end of the mountain and proceed east.
18

19 Gable Mountain contains extensive exposed basalt benches that would be well suited
20 for quarry development. An open-pit mine would not be developed unless restrictions were
21 placed on quarry expansion. Land reclamation at the site would be capable of blending the
22 quarry with the surrounding landscape.
23

24 Gable Mountain has considerable cultural resource value as a sacred site for American
25 Indian tribes. Development of a quarry at Gable Mountain would adversely impact a cultural
26 resource valued by American Indians and would represent an irreversible and irretrievable (I&I)
27 commitment of this cultural resource.
28

29 One Washington State plant species of concern (the stalked-pod milkvetch) and two
30 state wildlife species of concern (the loggerhead shrike and the prairie falcon) were observed at
31 the Gable Mountain site.
32

33 Gable Mountain is located in an area designated for Preservation in the Preferred
34 Alternative and Alternatives One, Two, and Four. Development of a quarry at this site would
35 not be consistent with this land-use designation. Gable Mountain is located in an area
36 designated for Conservation (Mining) under Alternative Three, and development of the quarry
37 would be consistent with this land-use designation. A quarry could also be developed under the
38 No-Action Alternative.
39

40 **D.2.3.6 Gable Butte Site.** Gable Butte is a prominent geologic feature north of Route 11A and
41 north of the 200 West Area. The quarry site would consist of outcrops located west of the
42 railroad grade at Gable Butte, immediately west of Gable Butte proper. A considerable quantity
43 of naturally occurring talus slope material is associated with these outcrops and thousands of
44 cubic meters of riprap could possibly be obtained from this material. Development of a quarry
45 at the Gable Butte Site would begin at the south end of the area of interest. Sufficient space is
46 available for stockpiling material and for parking equipment in the southern portion of this area.
47 The outcrops that would be quarried range in elevation from about 152 m (500 ft) to 182 m
48 (600 ft).
49

50 Gable Butte and associated outcrops have the capacity to meet all basalt needs at the
51 Hanford Site. The outcrops immediately west of Gable Butte provide excellent opportunities for
52 quarry expansion. Talus slopes at the base of the outcrops could supply significant quantities
53 of basalt that is already broken into riprap-sized material that may be suitable for cap
54 construction.
55

1 Gable Butte has cultural resource value as a sacred site for American Indian tribes.
2 Development of a quarry at Gable Butte would impact a cultural resource valued by American
3 Indians and would represent an I&I commitment of this cultural resource.
4

5 Two Washington State plant species of concern (the stalked-pod milkvetch and
6 crouching milkvetch) and one Washington State wildlife species of concern (the loggerhead
7 shrike) were observed at the Gable Butte site.
8

9 Gable Butte is located in an area designated for Preservation in the Preferred
10 Alternative and Alternatives One, Two, and Four. Development of a quarry at this site would
11 not be consistent with this land-use designation. Gable Butte is located in an area designated
12 for Conservation (Mining) under Alternative Three, and development of the quarry would be
13 consistent with this land-use designation. A Gable Butte quarry could also be developed under
14 the No-Action Alternative.
15

16 **D.2.3.7 West Haven Site.** The West Haven site consists of a single large basalt outcrop
17 located immediately east of Route 6 and west of Gable Butte. A considerable quantity of
18 naturally occurring talus slope material exists at this site and could provide many thousands of
19 cubic meters of riprap. The West Haven site and nearby outcrops have the capacity to supply
20 sufficient quantities of basalt material for cap construction. Development of a quarry at the
21 West Haven site would begin at the south end of the area of interest. Sufficient space is
22 available for stockpiling material and for parking equipment in the southern portion of this area.
23

24 West Haven contains extensive exposed basalt benches that would be well suited for
25 quarry development. An open-pit mine would not be developed unless restrictions were placed
26 on quarry expansion. Land reclamation at the site would be capable of blending the quarry with
27 the surrounding landscape.
28

29 Two Washington State plant species of concern (the crouching milkvetch and the
30 stalked-pod milkvetch) were observed at the West Haven site.
31

32 The West Haven Site is located in an area designated for Conservation (Mining) in the
33 Preferred Alternative and Conservation (Mining) in Alternative Three. Development of a quarry
34 at this site would be consistent with these land-use designations. The West Haven site is
35 located in an area designated for Preservation under Alternatives One, Two, and Four; and
36 development of the quarry would not be consistent with this land-use designation. The site
37 could also be developed under the No-Action Alternative.
38

39 **D.2.3.8 Section 9 Quarry.** The Section 9 quarry is a privately owned quarry located north of
40 Wanapum Dam. This quarry has considerable quantities of basalt in-place that could be
41 blasted and crushed to produce the desired riprap. Quarry development would be the
42 responsibility of the quarry operator. The status of threatened or endangered species and
43 cultural resources at this site is not known.
44

45 The Section 9 quarry and surrounding basalt formation could easily supply the volume
46 estimate of 15.3 million m³ (20 million yd³) of riprap used in evaluating sites (BHI 1995). Bank
47 reserve volumes at this quarry site are expected to be sufficient to meet the requirement for
48 basalt materials used in cap construction.
49

50 **D.2.3.9 DeAtley Quarry.** The DeAtley Quarry is a privately owned quarry located on the old
51 Highway 12, about 6.7 km (4.2 mi) east of Benton City, Washington. Development of the
52 quarry would be the responsibility of the quarry operator. The status of threatened or
53 endangered species and cultural resources at this site is not known.
54

55 The DeAtley Quarry and surrounding basalt formation could supply an estimated basalt

1 bank volume of 7.6 million m³ (10 million yd³) from this 24-ha (60-ac) site (BHI 1995). This
2 translates to approximately 11.6 million m³ (15.2 million yd³) of loose riprap. The DeAtley
3 Quarry might not have sufficient reserves to supply the quantity of basalt required for
4 construction of all caps on the Hanford Site.
5

6 **D.2.3.10 Mahaffey Quarry.** The Mahaffey Quarry is privately owned and located on Clodfelter
7 Road about 5.5 km (3.4 mi) from the intersection of Clodfelter Road and Clearwater Avenue in
8 Kennewick, Washington. Quarry development would be the responsibility of the quarry
9 operator. The status of threatened or endangered species and cultural resources at this site is
10 not known.
11

12 An area of 5.7 ha (14 ac) of the 16-ha (40-ac) quarry site is currently permitted for
13 operations at the Mahaffey Quarry. Total reserve estimates at this site are not known. Much of
14 the basalt is subsurface, with as much as 2.4 m (8 ft) of topsoil in places. The reserve estimate
15 for this site is assumed to be similar to that of the 24-ha (60-ac) DeAtley Quarry. The Mahaffey
16 Quarry may not have sufficient reserves to supply the quantity of basalt required for
17 construction of all caps on the Hanford Site.
18
19
20

Appendix E – Supplementary Information for Cumulative Impacts Analysis

This appendix summarizes potential cumulative impacts associated with Hanford Site land-use designations for each alternative identified in Chapter 3. Cumulative impacts result

... from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time ... (40 CFR 1508.7).

Reasonably foreseeable actions are identified and the relationship between these actions and the proposed land-use designations is discussed. The description of potential cumulative impacts couples impacts of each alternative with impacts from past and existing operations at the Hanford Site and impacts that may be associated with anticipated future actions.

Cumulative impacts to land use associated with present and reasonably foreseeable actions are discussed in Chapter 5, Section 5.5.1. Section 5.5.2 discusses potential cumulative impacts to the resources identified in Section 5.2; and Sections 5.5.3 and 5.5.4 discuss cumulative socioeconomic impacts and cumulative human health risk, respectively.

E.1 Past, Present and Reasonably Foreseeable Future Actions at the Hanford Site

This section describes additional, past, present and reasonably foreseeable actions that might not be fully implemented yet at the Hanford Site where potential impacts have been identified.

E.1.1 Wahluke Slope

The current management of lands within the Wahluke Slope is comparable to Preservation and Conservation. No new actions are presently planned for the Wahluke Slope, and DOE anticipates that the present management would continue under the No-Action Alternative. However, adoption of the alternative selected in the U.S. Department of the Interior (DOI) Record of Decision (ROD) for the *Hanford Reach of the Columbia River Final Environmental Impact Statement for Comprehensive River Study* (DOI 1996) would designate the Wahluke Slope as a wildlife refuge. This DOI designation requires Congressional action and the wildlife refuge would be managed similarly to the Preservation designation used in this Final HCP EIS. There are two proposals currently under consideration in Congress. The primary differences between the proposals include the extent of the geographic scope (i.e., whether the Wahluke Slope is addressed or not), and the designation of the land manager (local versus Federal control).

The DOE Preferred Alternative and Alternative One would designate the Wahluke Slope as Preservation as an overlay National Wildlife Refuge. Alternatives Two, and Four would designate the area for Preservation. Alternative Three would designate a large portion of the area for Agriculture, with the smaller areas designated for Conservation and Preservation. Small areas would also be designated for recreational use (High- and/or Low-Intensity) under all alternatives except Alternative Two. High-Intensity Recreation and Agriculture would not be consistent with the alternative selected in the DOI ROD for the Hanford Reach.

1 To the extent that DOE retains control of the Wahluke Slope, future actions in the
2 Wahluke Slope would be consistent with the land-use designation adopted through the ROD for
3 this Final HCP EIS.

4
5 **E.1.2 Columbia River Corridor**

6
7 Present and reasonably foreseeable actions with the Columbia River include the
8 following actions:

- 9
10 • **Hanford Reach of the Columbia River Final Environmental Impact**
11 **Statement for Comprehensive River Record of Decision (DOI 1996):** This
12 EIS addressed the need to protect the Hanford Reach as the last free-flowing,
13 nontidal stretch of the Columbia River in the United States. The ROD selected
14 the alternative that combined a Wild and Scenic River designation for the
15 Hanford Reach of the Columbia River and its immediate corridor with a National
16 Wildlife Refuge (NWR) designation for the Wahluke Slope (NPS 1994).
17 Recreational access points would be improved but not expanded, and additional
18 facilities and programs for visitor interpretation and education would be provided.
19 Damming and major dredging would be prohibited. Development of new
20 industrial facilities on the Hanford Site within the immediate river corridor would
21 be curtailed. Other DOE activities would be specifically allowed or be subject to
22 review and approval. The following potential impacts and benefits were
23 identified (NPS 1994):
- 24
25 -- Prohibiting damming and dredging would ensure favorable conditions for
26 salmon to migrate and spawn; preserve biodiversity and sensitive species
27 by preventing disturbance of habitat; maintain the existing high water
28 quality by reducing siltation; minimize water temperature change and the
29 potential contaminant releases associated with dredging; and would
30 prevent inundation and disturbance of cultural resources.
 - 31
32 -- Ongoing cultural resource inventories and surveys would maintain the
33 quality of historic and archaeological sites, identify new sites, and
34 document existing sites.
 - 35
36 -- Restricting development would reduce river siltation and prevent
37 disturbance of cultural and paleontological resources.
 - 38
39 -- Controlling exotic vegetation would prevent this vegetation from crowding
40 out native plants. Controlling nuisance aquatic macrophytes, such as
41 water milfoil, would reduce the impacts of these plants on water quality
42 and aquatic habitats. Revegetating disturbed areas with native plant
43 species would restore the diversity and abundance of native plant and
44 animal communities.
 - 45
46 -- Prohibiting off-road vehicle use would prevent disturbance of riparian and
47 upland habitats and cultural resource sites.
 - 48
49 -- Prohibiting grazing would minimize further damage to upland and riparian
50 habitats, but would impact tribal access for the purpose of grazing
51 animals and private citizens currently holding grazing permits.
 - 52
53 -- Increasing river patrols would reduce the impacts of wildfires, littering,
54 and disturbance of rare plants, wildlife, and cultural resources.
 - 55

- 1 - Conducting a study to examine sloughing of the White Bluffs and
2 identifying possible protective actions could lead to reduced sloughing,
3 which would benefit this important visual and paleontological resource.
4 Measures to reduce the sloughing of the White Bluffs could adversely
5 impact current irrigation practices on adjacent lands if irrigation is shown
6 to contribute to the sloughing.
7
- 8 - The Hanford Reach Study Team intends that the Wild and Scenic River
9 designation would not impose constraints on Hanford Site remediation.
10 New construction would be prohibited within the designated boundaries,
11 with the exception of intakes and outfall structures and required facilities
12 related to remediation of the Hanford Site.
13
- 14 - Habitat protection and restoration efforts would benefit recreational use
15 and access, as would increased river patrols and improvements in public
16 education efforts and recreational facilities.
17

18 In mandating the study in 1988, Congress provided interim protection of the
19 Hanford Reach by prohibiting development until November 1996. In 1996, Public
20 Law 104-333 extended this protection indefinitely. Activities such as damming or
21 dredging have been permanently prohibited. Congress must determine the
22 further disposition of the Hanford Reach study area through legislative action
23 (NPS 1994).
24

- 25 • **Decommissioning of eight surplus production reactors:** An EIS was prepared to
26 address the potential environmental impacts, benefits and costs, and institutional and
27 programmatic needs associated with decommissioning the eight surplus production
28 reactors in this area (DOE 1992a). The ROD for this action was published in
29 58 FR 48509. The DOE decided on safe storage followed by deferred one-piece
30 removal as the preferred alternative. The DOE intends to complete this
31 decommissioning action consistent with the schedule for remedial action in the
32 *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)
33 (Ecology et al. 1989). Therefore, the safe storage period would be for less than the
34 75-year time frame outlined in the *Decommissioning of Eight Surplus Production*
35 *Reactors* EIS. This action includes continuing surveillance, monitoring, and
36 maintenance, followed by transport of intact reactor blocks from the present locations
37 in the 100 Areas to the 200 West Area for disposal. Contaminated materials
38 associated with the fuel storage basins also would be disposed of in the 200 West
39 Area, along with contaminated equipment and components associated with the
40 reactors. Uncontaminated portions of the fuel storage basins would be removed to
41 provide access for machinery required to move the reactor blocks. Other
42 uncontaminated structures and equipment would be demolished and placed in
43 landfills in the vicinity of the reactor sites.
44

45 Occupational radiation doses associated with this action were estimated to be
46 approximately 51 person-rem, and short-term public radiation doses were estimated
47 to be near zero (DOE 1992a). Near-term ecological impacts were considered
48 minimal because of the existing disturbance from other radioactive waste
49 management activities and nuclear facility operations. The maximum number of
50 workers required at any time would be less than 100. Portions of the B Reactor may
51 be preserved for display in recognition of the cultural significance of the reactor.
52

53 Approximately 6 ha (15 ac) in the 200 Areas would be disturbed to accommodate
54 disposal of wastes resulting from decommissioning activities. This disturbance would
55 be partially offset by the 5 ha (13 ac) that would be available for revegetation in the

1 100 Areas after removal or dismantlement of the eight reactors. Additional habitat
2 disturbance would be required for construction of haul roads from the 100 Areas to
3 the 200 Area that are capable of handling the movers required to transport the
4 reactor blocks.

- 5
6 • **Deactivation of the N Reactor:** An environmental assessment (EA) was prepared
7 to address all nonroutine activities associated with the shutdown of the
8 105-N Reactor (N Reactor) (DOE 1995e); the finding of no significant impact (FONSI)
9 was issued on May 1, 1995. The EA identifies impacts associated with activities
10 required to prepare the reactor for decommissioning. No additional ground
11 disturbance would be anticipated from deactivation of the reactor. The maximum
12 exposed individual (MEI) in the offsite population would receive a dose less than
13 0.001 mrem/yr and the collective dose to the population would be 0.025 person-rem.
14 Deactivation would require approximately 200 workers for three years, with only three
15 workers required after deactivation was complete.

16
17 These actions are consistent with and would enable the land-use designations under all
18 alternatives.

19 20 **E.1.3 Central Plateau**

21
22 Present and reasonably foreseeable actions in the 200 Areas include the following:

- 23
24 • **Office of River Protection:** The DOE has issued a ROD for an EIS that analyzed
25 alternatives for remediating the waste currently contained in the 177 single-storage
26 tanks (SSTs) and double-storage tanks (DSTs) in the 200 Areas and in about 60
27 active and inactive miscellaneous underground storage tanks, and providing for safe
28 storage and disposal of strontium and cesium capsules used in research projects at
29 Hanford Site and offsite locations (DOE and Ecology 1996). The EIS evaluated a
30 range of waste retrieval and removal and in-place remediation options for the SSTs
31 and DSTs. The ROD presented the selected alternative of phased implementation
32 and deferred the decision on disposition of cesium and strontium capsules (DOE
33 1997). Under phased implementation, tank wastes would continue to be stored until
34 the waste is retrieved in a demonstration phase (Phase I) to verify that treatment
35 processes will function effectively. After Phase I, the full-scale production phase
36 (Phase II) would be implemented. Potential impacts associated with this project
37 include worker exposures to radiological and hazardous constituents during waste
38 disposition and habitat disturbance.
- 39
40 • Worker exposures to hazardous and/or radioactive constituents were evaluated in the
41 EIS. It is estimated that health effects due to radiation exposure would include
42 approximately three latent cancer fatalities in operational workers over the life of the
43 project.

44
45 Approximately 138 ha (340 ac) of shrub-steppe habitat would be disturbed.

- 46
47 • **In 1997, DOE prepared a supplement analysis to determine if additional NEPA**
48 **review was required for a series of tank farm infrastructure upgrades (DOE-RL**
49 **1997a):** These upgrades focus on capital improvements necessary for continued
50 safe operation of DST facilities and selected SST facilities. Most of the activities
51 would involve replacing or upgrading existing systems. In May 1997, DOE
52 determined that the potential impacts of the project were adequately bounded by the
53 analysis in the Tank Waste Remediation System (TWRS) EIS; therefore, an
54 additional *National Environmental Policy Act of 1969* (NEPA) analysis was not
55 required.

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- **Plutonium Finishing Plant stabilization:** The DOE has issued a final EIS addressing stabilization of the radioactive materials present in the Plutonium Finishing Plant (PFP) (DOE-RL 1996a). Potential impacts include worker exposure and radiological air emissions. All activities will take place within the facility. There will be no change in land use.
 - **Environmental Restoration Disposal Facility (ERDF):** The ERDF was constructed adjacent to the 200 Areas and started operation in August 1996. The facility provides for storage and disposal of waste generated during environmental restoration activities at the Hanford Site (EPA 1995b). The ERDF is the disposal facility for most of the waste excavated during remediation of waste management units at the Hanford Site. Waste generated from remediation of past-practice waste sites and CERCLA remedial activities is placed in the ERDF. The facility accepts only waste that originates on the Hanford Site, which includes dangerous waste, radioactive waste, and mixed waste. The ERDF will be expanded, as needed, ultimately covering as much as 4.1 km² (1.6 mi²) south of the 200 Areas. Initial construction involved 65 ha (165 ac) of this area. In August 1997, DOE, the U.S. Environmental Protection Agency (EPA), and Ecology proposed to expand the existing two operating cells of the ERDF by initiating construction of two additional cells (DOE-RL 1997b). This expansion would require an additional 28 ha (70 ac) within the original ERDF footprint. The original cells were constructed using a double-liner with a leachate collection and recovery system. The new cells would be constructed using the same design.

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Under current climate conditions, contaminants placed in the ERDF are expected to reach groundwater within 10,000 years. After 10,000 years, estimated human health risks are a maximum incremental lifetime cancer rate (ILCR) of 5×10^{-6} and a maximum hazard quotient for noncarcinogens of 0.2 (a hazard quotient of 1 or greater indicates a health concern). Ecological impacts will occur at the ERDF site and at quarries for materials to be used in the liner and cover. The shrub-steppe habitat at the ERDF site is considered priority habitat by the State of Washington and a number of Washington State monitored or candidate species may be affected by the ERDF. The estimated disturbed area ranges from 14 to 54 ha (35 to 133 ac) for the silt quarry (McGee Ranch). The total disturbed area at the actual ERDF site (including the trench, stockpiling areas, roads, and supporting facilities) is estimated to be 260 ha (640 ac), or approximately 2.6 km² (1 mi²). Significant cultural resources have not been identified at the ERDF site. Operation of the ERDF provides up to 167 full-time positions at the Hanford Site. The total estimated capital costs for the ERDF range from \$246 million to \$663 million. Visual and noise impacts of ERDF construction and operation are considered negligible.

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- **Programmatic Spent Nuclear Fuel Management:** The DOE developed the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement* (DOE 1994a) and issued the ROD (60 FR 28680). This decision establishes DOE policies for the environmentally safe transport, storage, and management of spent nuclear fuels. A large portion of the DOE-owned inventory of SNF is already stored at the Hanford Site, and the Hanford Site has been identified as a participant in the management of spent fuel. The selected alternative – regionalization of SNF storage by fuel type – requires management of defense production spent fuel at the Hanford Site and transport of other spent fuel currently stored at the Hanford Site to the INEEL.

An amendment to the ROD (61 FR 9441) was issued to the public on March 8, 1996,

1 to reflect modifications to the original decision resulting from a settlement agreement
2 reached by DOE, the State of Idaho, and the U.S. Department of the Navy. The
3 amended ROD indicates that only 12 of the originally planned 524 shipments of SNF
4 would be shipped from the Hanford Site to Idaho. These 12 shipments will consist of
5 the sodium-bonded FFTF fuel.
6

7 Land disturbance associated with this action at the Hanford Site is estimated at 7 ha
8 (18 ac) of shrub-steppe habitat west of the 200 East Area. Estimates of employment
9 required for construction activities range from 176 to 1,065 employees during the
10 years from 1997 to 2000. Operations would require 208 to 230 employees through
11 2004, with levels gradually declining to 50 to 60 workers beyond the year 2004. Many
12 of these employees would be drawn from the existing Hanford Site workforce.
13 Construction of the new facilities is not expected to have any significant impact on
14 cultural resources. Solid waste generation would be a maximum of 330 m³/yr
15 (11,654 ft³/yr), or approximately 4 percent of the 21,000 m³/yr (740,000 ft³/yr)
16 currently generated at the Hanford Site. The MEI in the general population would
17 receive a dose of 0.007 to 0.02 mrem/yr from waste-processing activities. Resource
18 (e.g., materials, fuels, and public funds) required to implement this action would
19 overlap with the time periods when the same type of resources would be required by
20 remediation activities at the Hanford Site.
21

- 22 • **Hanford Spent Nuclear Fuel Management:** A Hanford Site EIS was prepared to
23 tier from the ROD (60 Fed. Reg. 28680) for the *Department of Energy Programmatic*
24 *Spent Nuclear Fuel Management and Idaho National Engineering Laboratory*
25 *Environmental Restoration and Waste Management Programs Draft Environmental*
26 *Impact Statement* (DOE 1994a). The EIS analyzed the potential environmental
27 impacts of the removal of SNF from the K Basins and subsequent management of
28 the fuel for up to 40 years (DOE 1995d). The ROD for management of K Basin SNF
29 was issued on March 4, 1996 (61 FR 10736).
30

31 The ROD indicates that the Preferred Alternative identified and analyzed in the EIS,
32 with minor modifications, will be implemented. This alternative consists of removing
33 the SNF from the basins, vacuum drying, conditioning, and sealing the SNF in inert
34 gas-filled canisters for dry vault storage in a new facility to be built at Hanford for up
35 to 40 years, pending decisions on ultimate disposition. The K Basins will continue to
36 be operated during the period over which the alternative is implemented. The action
37 also includes transfer of the basin sludge to Hanford DSTs for management, disposal
38 of non-SNF debris in a low-level burial ground at the Hanford Site, disposition of
39 basin water, and deactivation of the basins pending decommissioning. A total of
40 3.5 ha (8.7 ac) of land and native vegetation would be disturbed or destroyed during
41 land-clearing activities to provide new facilities for this project.
42

- 43 • **200 Area Effluent Treatment Facility:** In 1992, DOE prepared an EA and FONSI
44 (DOE 1992b) that addressed environmental upgrades to liquid waste effluent
45 systems, including the 200 Area Effluent Treatment Facility, located near the
46 200 East Area. This facility provides effluent treatment and disposal capability
47 required to restart the 242-A Evaporator, which reduces tank waste volume by
48 removing process condensate. The Effluent Treatment Facility provides for effluent
49 collection, a treatment system to reduce the concentration of hazardous and
50 radioactive waste constituents in the effluent streams to acceptable levels, tanks to
51 allow verification of effluent characteristics before discharge, and a state-approved
52 land disposal structure (SALDS) for effluents. The SALDS infiltration gallery consists
53 of a 35- by 61-m (116- by 200-ft) rectangular drain field that is located north of the
54 200 West Area.
55

1 Environmental impacts associated with this project include habitat destruction
2 associated with the construction of the treatment facility, transfer piping, and the
3 SALDS; and the discharge of small quantities of contaminants to the ground through
4 the SALDS. In particular, the discharge of tritiated streams is of concern, but
5 because of the relatively short half-life of tritium (12.3 years), the long residence time
6 of the effluent in the groundwater could be expected to be sufficient to attenuate the
7 tritium before it reaches the Columbia River.
8

- 9
- 10 • **Operation of Low-Level Burial Grounds:** The low-level burial grounds located in
11 the 200 West and 200 East Areas are an active, permitted RCRA landfill and cover a
12 total area of 225 ha (556 ac). The landfill is divided into eight burial grounds and
13 each burial ground consists of a number of trenches that contain, or will contain,
14 low-level radioactive and mixed waste. Six burial grounds are located in the
15 200 West Area and two burial grounds are located in the 200 East Area. Impacts
16 associated with operation of the burial grounds include habitat disturbance or loss
17 and the potential for generation of fugitive dust.

18 The DOE recently decided to widen one of the trenches in the 218-W-5 Low-Level
19 Burial Ground to accommodate large, packaged low level waste, and to facilitate
20 segregation of low-level waste.
21

- 22 • **Operation of the U.S. Ecology, Inc. Commercial Low-Level Radioactive Waste
23 Landfill for offsite commercial waste:** U.S. Ecology, Inc., operates a radioactive
24 waste landfill that accepts commercially generated low-level wastes from states
25 included in the Northwest low-level radioactive waste compact. U.S. Ecology, Inc.,
26 accepted 2,191 m³ (77,418 ft³) of naturally occurring wastes and 5,801 m³
27 (204,981 ft³) of low-level radioactive wastes in 1995 (TCH 1996b). The U.S. Ecology,
28 Inc., landfill is located directly east of the ERDF landfill. Habitat disturbance is the
29 primary impact associated with the facility. In February 1997, the Washington State
30 Departments of Health and Ecology determined that an EIS must be prepared under
31 SEPA before the state can make several key environmental decisions regarding this
32 site. These decisions include approval of a site closure plan, renewal of the
33 operating license, and an amendment to the regulations limiting the receipt of
34 naturally occurring and accelerator-generated radioactive materials. Public scoping
35 took place through March 27, 1997, and the draft EIS is currently in preparation.
36

- 37 • **Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste
38 Storage Facility, infrastructure upgrades, and Central Waste Support Complex:**
39 The DOE prepared an EA addressing several waste management projects in the
40 200 Areas (DOE-RL 1995b). A FONSI was issued on September 28, 1995, that
41 addressed the construction of the solid waste retrieval complex, an enhanced
42 radioactive and mixed waste storage facility, infrastructure upgrades, and a Central
43 Waste Support Complex. These projects will be undertaken in the 200 West Area
44 and involve approximately 36 ha (89 ac), or about 5 percent of the 777 ha (1,920 ac)
45 in the 200 West Area. Most activities will occur in previously disturbed areas. The
46 waste storage facility, however, will be constructed on relatively undisturbed land,
47 resulting in an incremental loss of shrub-steppe habitat essential for species such as
48 the loggerhead shrike and sage sparrow.
49

50 Discharges of nonradioactive liquid effluents could incrementally increase discharges
51 of nonradioactive effluents in the 200 Areas by 43,000 m³ gal (11 million gal), which
52 would comprise approximately 2 percent of the total discharge. This additional
53 volume is not expected to produce any discernable mounding of the groundwater.
54 Changes in the movement of underground contaminant plumes also are not
55 expected.

1 Implementation of the proposed action would not be expected to produce a
2 cumulative socioeconomic impact, and discernable changes in the radiation dose to
3 offsite receptors would not be expected.
4

- 5 • **Tank 241-C-106 sluicing and waste removal:** This project addresses the need to
6 retrieve the high-heat waste in SST 241-C-106 and transfer the waste to DST
7 241-AY-102. The DOE has identified a need to take this action to eliminate safety
8 concerns with the storage of high-heat waste in Tank 241-C-106, and to demonstrate
9 a tank waste retrieval technology. The removal of the waste would stabilize this tank
10 and eliminate the need to add cooling water. An EA (DOE 1994b) and FONSI were
11 issued in February 1995.
12

13 Tank 241-C-106, which is located in the 200 East Area, has a 31-cm (10-in) -thick
14 dished bottom, and a useable waste depth of approximately 4.8 m (16 ft) at the
15 sidewall. The waste in Tank 241-C-106 consists of 746,000 L (197,000 gal) of sludge
16 that is stratified into two layers. The top layer consists of 655,000 L (173,000 gal) of
17 sludge, containing a sufficient amount of strontium to be considered high-heat waste,
18 which generates approximately 32 kW of heat. The bottom layer consists of 91,000 L
19 (24,000 gal) of low-heat producing hardened material.
20

21 The high-heat waste will be sluiced from Tank 241-C-106 to a DST through a
22 double-encased (pipe-in-pipe design), bermed line. The system will be a closed loop,
23 continuous sluicing process. The scope of the project is to remove 75 percent, at a
24 minimum, of the high-heat waste. Sluicing of underground storage tanks involves
25 introducing a high-volume, low-pressure stream of liquid to mobilize underground
26 storage tank sludge waste before pumping the tank contents. Impacts associated
27 with this action are potential worker exposure concerns.
28

- 29 • **Disposal of decommissioned, defueled cruiser, Los Angeles Class, and Ohio
30 Class naval reactor plants:** This final EIS, prepared by the U.S. Navy, evaluates
31 the potential impacts of disposing of approximately 100 defueled reactor plants from
32 decommissioned naval vessels (Navy 1996). The ROD was published in the *Federal
33 Register* on August 9, 1996. The selected alternative is to dismantle the vessels at
34 the Puget Sound Naval Shipyard and transport the reactor plants, by barge, to the
35 low-level burial grounds at the Hanford Site. The DOE was a cooperating agency in
36 the preparation of this EIS.
37
- 38 • **Plutonium-Uranium Extraction Plant (PUREX)/Uranium Trioxide Plant
39 shutdown:** In 1993, DOE directed Westinghouse Hanford Company to terminate
40 operations at the PUREX Plant and provided guidance to proceed with shutdown
41 planning and terminal clean-out activities. This direction also covered the Uranium
42 Trioxide Plant at completion of the pending shutdown campaign. An EA addressing
43 transfer of the irradiated fuel from PUREX and the N Reactor irradiated fuel for
44 storage at the 105-KE and 105-KW Fuel Storage Basins was prepared (DOE 1995e)
45 and a FONSI was approved on July 12, 1995. The FONSI identified that
46 unprocessed irradiated fuel would be transported from the PUREX Plant and the 105-
47 N Reactor to the 105-KE and 105-KW fuel storage basins in the 100 K Area; the fuel
48 would be placed in storage at the K Basins and eventually would be dispositioned in
49 the same manner as the other existing irradiated fuel inventory stored in the K
50 Basins. A maximum of three railcar shipments of fuel would be made; two fuel
51 shipments from the PUREX Plant and one from the N Reactor would be shipped to
52 the K basins, unloaded, and stored with the existing fuel. The PUREX fuel removal
53 action has been completed. The 100-N Basin cleanout was completed in 1998.
54

1 These activities are consistent with the Industrial-Exclusive designation for the 200 Areas
2 under all alternatives.
3

4 **E.1.4 All Other Areas** 5

6 Present and reasonably foreseeable actions in other Hanford areas include the following:
7

- 8 • **Construction and operation of a Laser Interferometer Gravitational-Wave
9 Observatory (LIGO) on the Hanford Site:** An EA was prepared by the National
10 Science Foundation for construction and operation of a LIGO (NSF 1993), and
11 a FONSI was issued in December 1993. The LIGO site occupies approximately
12 6 km² (2.3 mi²), including a support facility at the vertex of two 4-km (2.5-mi) arms,
13 mid- and end-station buildings along the arms, service roads, parking areas and
14 construction laydown areas. Service roads, running the length of the 4-km (2.5-mi)
15 arms, fragment habitat that exists at the site. The facility will accommodate 10 to 20
16 permanent staff, with an additional 10 visiting scientists. The LIGO is currently
17 operating.
18

19 The LIGO is located in an area designated for Research and Development in the
20 Preferred Alternative and Alternatives Two and Three, and Conservation in
21 Alternatives One and Four. The LIGO represents a use that is consistent with
22 Research and Development and Industrial use designations.
23

- 24 • **Environmental Molecular Sciences Laboratory (EMSL):** A FONSI for the EMSL
25 EA (DOE 1990b) was issued in 1992. The EMSL would consist of an 18,500-m²
26 (200,000-ft²) building originally proposed for siting on a 12-ha (30-ac) site located
27 near the Columbia River, in the southeast portion of the Hanford Site. On the second
28 day of construction, April 12, 1994, construction crews uncovered human remains
29 thought to be those of American Indians. The DOE immediately halted construction
30 and proposed, consistent with the wishes of local American Indian tribes and with the
31 spirit of the *Native American Graves Protection and Repatriation Act of 1990* and the
32 *American Indian Religious Freedom Act of 1978*, to relocate the site of the facility.
33 Another EA was prepared to address re-siting the facility (DOE 1994c) in the south
34 part of the 300 Area; the FONSI was approved in July 1994. Construction of the
35 facility was recently completed at the new site. Approximately 200 to 250 employees
36 are located at the EMSL, including permanent staff and visiting scientists.
37

38 The EMSL is within an area designated for Industrial development under all
39 alternatives. The EMSL represents a use pattern that is consistent with this
40 designation.
41

- 42 • **Inert/Demolition Waste Landfill (Pit 9):** An EA was prepared for the proposal to
43 construct a waste landfill (Pit 9) to accommodate inert and demolition waste for the
44 Hanford Site (DOE 1995g). The DOE identified a need for convenient and economic
45 disposal capacity of these types of waste to support the decommissioning activities
46 planned for the southern areas of the Hanford Site. The current demolition waste
47 landfill, Pit 10, located approximately 25 m (82 ft) west of Route 4S, reached full
48 capacity in 1995. The projected decommissioning activities on the Hanford Site will
49 continue for up to 20 years; therefore, a replacement demolition landfill is required in
50 the near-term. The DOE proposed to use an existing alluvial gravel pit – Pit 9 – as a
51 new inert and demolition waste landfill for the Hanford Site. Pit 9 is located
52 approximately 3 km (1.9 mi) north of the 300 Area, in the 600 Area. Based on current
53 disposal projections, Pit 9 will be available for inert waste for 20 years. The FONSI
54 for this action was approved May 15, 1995, and Pit 9 has been open and operational
55 since approximately July 1995. Impacts associated with this action include minor

1 habitat disturbances.

2
3 Pit 9 is located within an area that is designated for Conservation under the Preferred
4 Alternative and Alternative Three, and this activity is consistent with this designation.
5 However, Alternatives One, Two, and Four designate the location of Pit 9 for
6 Preservation, which is not consistent with the current use of Pit 9 as an
7 inert/demolition waste landfill.
8

- 9 • ***Programmatic Environmental Impact Statement for Accomplishing Expanded
10 Civilian Nuclear Energy Research and Development and Isotope Production
11 Missions in the United States, Including the Role of the Fast Flux Test Facility
12 (DOE/EIS-0310):*** The 400 Area, located southeast of the 200 East Area, is the site
13 of the Fast Flux Test Facility (FFTF). The FFTF is a 400 megawatt thermal, liquid
14 metal (sodium-cooled) nuclear research test reactor that was constructed in the late
15 1970s and operated from 1982 to 1992. Although not designed nor operated as a
16 breeder reactor, the FFTF operated during these years as a national research facility
17 for the Liquid Metal Fast Breeder Reactor Program to test advanced nuclear fuels,
18 materials, components, systems, nuclear operating and maintenance procedures,
19 and active and passive safety technologies. The reactor was also used to produce a
20 large number of different isotopes for medical and industrial users, generate tritium
21 for the United States fusion research program, and conduct cooperative, international
22 research.
23

24 In December 1993, the FFTF was shutdown due largely at that time from
25 determinations that the facility could not continue to operate economically. In
26 April 1995, defueling was completed and usable fuel is stored on site in fuel storage
27 vessels or in the secure vault at the Plutonium Finishing Plant at the Hanford Site.
28 Unusable spent nuclear fuel (SNF) has been thoroughly washed to remove all sodium
29 residuals, dried, and placed in approved, 50-year Interim Storage Casks on the
30 400 Area Interim Storage Area pad. In November 1995, the reactor was placed in
31 standby mode with the main cooling system operating at approximately 200°C
32 (400°F) to keep the sodium coolant liquid and circulating to maintain DOE's option to
33 restart and operate the reactor in the future. Essential systems, staffing, and support
34 services are being maintained in a manner that will support either timely restart or
35 deactivation of the FFTF. In January 1997, the Secretary of Energy officially directed
36 that the FFTF be maintained in a standby condition while an evaluation was
37 conducted of any future role the facility might have in the DOE's national tritium
38 production strategy. In December 1998, the Secretary determined that the FFTF
39 would not play a role in the nation's tritium production strategy.
40

41 In May 1999, the Secretary announced that DOE would ask the Pacific Northwest
42 National Laboratory (PNNL) to complete a 90-day study that would resolve
43 outstanding informational needs for the FFTF. Results of this study were completed
44 and documented in a program scoping plan presented by PNNL to the DOE in early
45 August 1999. As a result of this study, the Secretary decided, on August 18, 1999,
46 that DOE would conduct a programmatic *National Environmental Policy Act* (NEPA)
47 review, including an Environmental Impact Statement (EIS), evaluating the potential
48 environmental impacts associated with proposed expansion of infrastructure,
49 including the possible role of the FFTF, for civilian nuclear energy research and
50 development activities; production of isotopes for medical, research, and industrial
51 uses; and production of plutonium-238 for use in advanced radioisotope power
52 systems for future National Aeronautic and Space Administration (NASA) space
53 missions. The Notice of Intent for this programmatic EIS is planned for publication in
54 the *Federal Register* on September 15, 1999. The Final EIS (FEIS) is planned for

1 completion in the Fall of 2000; a Record of Decision utilizing the NEPA review,
2 including the FEIS, is planned by December 2000.

3 4 **E.1.5 Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve).**

5
6 No new actions are currently planned for the ALE Reserve. To ensure that the ALE
7 Reserve's natural resources would be protected, the U.S. Fish and Wildlife Service (USFWS)
8 manages the ALE Reserve for DOE. This management is comparable to a land-use designation
9 of Preservation, as defined in this Final HCP EIS.

10
11 The ALE Reserve is primarily designated for Preservation under all alternatives, except
12 Alternative Three, which designates the ALE Reserve for Conservation (Mining). The Preferred
13 Alternative and Alternative Four also include areas designated for Conservation (Mining). These
14 areas would accommodate the potential for development of a quarry. Land-use designations for
15 the ALE Reserve are consistent with anticipated future actions. The Conservation (Mining)
16 designation under Alternative Three would accommodate a greater range of uses throughout the
17 ALE Reserve. The impacts associated with this designation would be greater than for the
18 Preservation/Conservation (Mining) designation under the Preferred Alternative and Alternative
19 Four, or for the Preservation designation under Alternatives One and Two.

20 21 22 **E.2 Other Potential Hanford Site Actions**

23
24 A number of other proposed actions at the Hanford Site are likely to be proposed and
25 evaluated in the future. Impacts of these projects cannot be considered in this analysis,
26 because impact analyses are not complete and decisions regarding implementation of a
27 preferred action have not been made. These projects may contribute to cumulative future
28 impacts considered in the HCP EIS. No additional actions that may affect cumulative impacts
29 associated with the Columbia River are proposed. However, actions in other Hanford areas may
30 have indirect effects on the river.

31 32 **E.2.1 Central Plateau**

33
34 Actions that may contribute to cumulative impacts in the Central Plateau (200 Areas)
35 include the following.

- 36
37 • **Hanford Solid Waste EIS:** The DOE is considering preparation of an EIS to
38 evaluate alternatives for management of radioactive and hazardous wastes
39 generated at the Hanford Site or received at Hanford from offsite generators. The
40 specific waste types to be considered in the analysis include: low-level radioactive
41 waste, mixed low-level radioactive and hazardous waste, transuranic radioactive and
42 mixed waste, hazardous waste, and contaminated equipment and materials for
43 reuse, recycle, or disposal. The EIS would update NEPA analyses addressing
44 ongoing activities, implement associated waste management programmatic RODs,
45 and facilitate site- and program-specific decisions on the future operation of Hanford
46 TSD facilities.

47
48 These activities are consistent with the Industrial-Exclusive land-use designation
49 proposed for the 200 Areas under all alternatives.
50

2
3 Other actions that may contribute to cumulative impacts in the All Other Areas
4 geographic area of the Hanford Site include the *Bonneville Power Administration Transmission*
5 *System Vegetation Management Program Draft Environmental Impact Statement (DOE/EIS-*
6 *0285)*. This DEIS establishes Planning Steps for managing vegetation across 24,000 km
7 (15,000mi) of power lines and 350 substations in the northwest and would determine the
8 available vegetation control techniques, herbicides used, and acceptable biological impacts..
9 The Draft EIS was issued August, 1999 and public comment is open until October 9, 1999.

10
11 An EIS DOE prepared on the disposition of the United States inventory of weapons
12 useable surplus plutonium examined reasonable alternatives and potential environmental
13 impacts for the proposed siting, construction, and operation of three types of facilities for
14 plutonium disposition and determined that Hanford's 400 Area was not a preferred site. The first
15 was a facility to disassemble and convert pits (a nuclear weapons component) into plutonium
16 oxide suitable for disposition. The facility would have been located at either the Hanford Site,
17 INEEL, Pantex Plant, or Savannah River Site (SRS). The second was a facility to immobilize
18 surplus plutonium in a glass or ceramic form for disposition in a geologic repository pursuant to
19 the Nuclear Waste Policy Act. The second facility would have been located at either the Hanford
20 Site or the SRS and included a collocated capability to convert nonpit plutonium materials into a
21 form suitable for immobilization. The third type of facility would have fabricated mixed oxide
22 (MOX) nuclear fuel from plutonium oxide. The MOX fuel fabrication facility would have been
23 located at either the Hanford Site, INEEL, Pantex Plant, or SRS. All of these proposed missions
24 and the *Tritium Supply and Recycling Programmatic Environmental Impact Statement* went to
25 the SRS.

26 27 28 **E.3 Past, Present and Reasonably Foreseeable Actions Adjacent to the** 29 **Hanford Site**

30
31 No major actions have been identified outside the Hanford Site boundary that would
32 significantly contribute to environmental impacts of the proposed action. The Siemens Power
33 Corporation currently operates six waste water lagoons to dispose of approximately
34 95,000 kg/day (25,000 gal/day) of effluent containing fluoride, nitrates, and minor amounts of
35 radionuclides. This discharge is not considered during the analysis of cumulative environmental
36 impacts, however, because the facility recently initiated a program to switch to a dry
37 manufacturing system that will eliminate the waste stream. Siemens will complete conversion to
38 the dry manufacturing system by 1998 and will phase out the use of lagoons completely by the
39 year 2004 (TCH 1996b).

40
41 In 1996, DOE prepared an EA to address the transport of up to 5,120 m³ (6,696 yd³) of
42 contact-handled low-level mixed waste from the Hanford Site to the Allied Technology Group
43 (ATG) private gasification and vitrification building in Richland, Washington, for treatment (DOE-
44 RL 1996). Treated waste would be returned to the Hanford Site for disposal. The waste would
45 be staged to the ATG facility over a 10-year period. The building is on a 18.2 ha (45 ac) ATG
46 site adjacent to ATG's licensed low-level waste processing facility approximately 0.3 km (0.2 mi)
47 south of the 300 Area. The action by ATG is being undertaken as a private action in anticipation
48 of future work for a variety of contracts, including DOE. The ATG facility is located adjacent to
49 the Hanford Site boundary in an industrial area in the City of Richland. Effects of construction
50 and overall operation have been evaluated in an EIS under the SEPA which was issued on
51 February 23, 1998.

52
53 City and county planning officials were consulted to assess other potential actions
54 outside the Hanford Site boundary. The actions identified are primarily road, bridge, and sewer

1 system improvements that are likely to have only minor impacts themselves and are limited
2 compared to the large scale of actions associated with the proposed future land-use objectives.
3 Ongoing economic and residential development in the region could contribute to cumulative
4 socioeconomic impacts. However, as discussed in Chapter 5, there is considerable uncertainty
5 associated with any analysis of such impacts, given available information on the scheduling of
6 potential actions at the Hanford Site.
7

8 Land-use planning efforts for areas outside of and surrounding the Hanford Site are
9 currently being undertaken by Benton, Franklin, and Grant counties; and by the City of Richland.
10 These planning efforts will establish land uses that will be permitted by local governments in
11 areas surrounding the Hanford Site. The City of Richland prepared a EIS under SEPA, finalized
12 on August 27, 1997, that identified an urban growth area involving Hanford Site land in the
13 vicinity of the 300 Area. A similar area, of varying size, is identified for Industrial use under all
14 alternatives. The City of Richland's Comprehensive Plan is consistent with current and
15 proposed future land uses at Hanford and DOE missions.
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1
2 **Appendix F — Revised Draft HRA-EIS Comment Response**
3 **Summary**
4
5

6 **F1.0 Introduction**

7
8 On April 23, 1999, the U.S. Department of Energy (DOE) issued the *Revised Draft*
9 *Hanford Remedial Action Environmental Impact Statement and Comprehensive Land-Use Plan*
10 (DOE/EIS-0222D) for review by Washington and Oregon state governments, Indian Tribes,
11 other Federal agencies, county and municipal governments, special-interest groups,
12 environmental groups, and the general public. The formal comment period ran for 45 days, from
13 April 23, 1999 to June 7, 1999.

14
15 As part of the public comment process, DOE held four public hearings to receive
16 comments. These hearings were held in Portland, Oregon on May 18, 1999; Richland,
17 Washington on May 20, 1999; Mattawa, Washington on June 2, 1999; and Spokane,
18 Washington on June 3, 1999.

19
20 The DOE solicited public comment on a proposed name change for the document as well
21 as on the document itself. The DOE proposed changing the name of the EIS from the *Hanford*
22 *Remedial Action Environmental Impact Statement and Comprehensive Land-Use Plan* (HRA-
23 EIS) to a title that better reflects land use. The public endorsed this change and, in the Final
24 EIS, the name of the HRA-EIS has been changed to the *Hanford Comprehensive Land-Use Plan*
25 *Environmental Impact Statement* (HCP EIS).

26
27 The DOE received more than 400 comment documents on the Revised Draft HRA-EIS.
28 Comment documents included letters, postcards, questionnaires, and surveys as well as
29 electronic mail. Comment documents were received from tribes and Federal agencies,
30 Washington and Oregon state agencies, county and municipal governments, environmental
31 groups, and private citizens. In addition, more than 200 pages of transcripts were generated
32 during the public hearings.

33
34 Comments received on the Revised Draft HRA-EIS as well as the transcripts from the
35 public hearings are contained in a Final HCP EIS Comment Response Document which, in
36 addition to being sent to the EIS mailing list, is available for review in the DOE public reading
37 rooms. The Comment Response Document consists of three parts: 1) a summary of the major
38 topics raised by public comments received and DOE's generalized responses (also included as
39 Appendix F), 2) specific public comments and DOE's specific responses, and 3) a copy of each
40 public comment received by DOE on the Revised Draft HRA-EIS, and copies of the complete
41 transcripts from each of the four public hearings. Indices are provided in the Comment
42 Response Document to enable commenters to find their comments and DOE's responses.

43
44 The Final EIS is being transmitted to commenting agencies, made available to the public,
45 and filed with the Environmental Protection Agency (EPA). A DOE decision on proposed actions
46 would not be made earlier than 30 days after EPA publishes a Notice of Availability for the Final
47 EIS in the *Federal Register*. The DOE would record its decision as a publicly available Record
48 of Decision (ROD) published in the *Federal Register*.

49
50 **F1.1 Methodology**

51
52 The DOE considered all comments. Equal weight was given to spoken and written
53 comments, to comments received at the public hearings, and to comments received in other
54 ways. The comment period was not intended to solicit "votes" or "endorsements" regarding the

1 proposed action or any alternative analyzed. Rather, comments were reviewed for content and
2 relevance to the environmental analysis contained in the EIS.
3

4 Spoken comments presented at the public hearings were recorded by a court reporter
5 and a verbatim transcript produced (see transcripts at the end of this document). The written
6 comments and transcripts were reviewed and the major topics were identified. These major
7 topics are summarized below in Section F2.0 and repeated in the comment response document.
8 The summarized topics are followed by DOE's generalized responses. The letter numbers are
9 indexed to the authors in the comment response document, but not in this Appendix.
10
11

12 ***F2.0 Major Topics (Summarized) and DOE's Responses***

13
14 The DOE considered all comments received on the Revised Draft HRA-EIS. Many of the
15 comments supported particular alternatives or a combination of alternatives, while others
16 addressed environmental issues, such as the value of wildlife habitat and the importance of
17 preserving habitat for plants and animals (including the diminishing population of salmon).
18 A significant number of comments addressed designating the Hanford Reach as a Wild and
19 Scenic River.
20

21 ***F2.1 Major Topics***

22
23 The major topics associated with the comments received on the Revised Draft HRA-EIS
24 are presented collectively in this section. Each major topic raised through the comment process
25 (including the number of comments supporting or opposed to a particular subject) is summarized
26 below, followed by DOE's generalized response to the summarized comments and the numbers
27 (codes) of those who commented.
28

29 ***F2.1.1 No-Action Alternative***

30
31 Four letters commented on the No-Action Alternative. Two of the three opposed the lack
32 of planning in this alternative. One comment supported this alternative. One commenter
33 supported the No-Action Alternative if Alternative Three was not selected. (Total No-Action
34 Alternative = 4). RL075, RL291, RL322, RTM015
35

36 ***DOE's Response:*** The No-Action Alternative does not provide for overall planning at the
37 Hanford Site. The DOE is required, under 42 USC 7274k (Public Law 104-201, Section 3153,
38 *National Defense Authorization Act for Fiscal Year 1997*), to develop a future-use plan for the
39 Hanford Site. The DOE policy is to support critical DOE missions, stimulate the economy, and
40 protect the environment. This land-use plan provides a means for coordinating planning and
41 plan implementation with Tribal governments and local jurisdictions, as well as facilitating site
42 and infrastructure transition and privatization activities.
43

44 ***F2.1.2 DOE's Preferred Alternative***

45
46 Numerous people offered comment on the DOE's Preferred Alternative in the Revised
47 Draft HRA-EIS, with 27 letters in favor of the alternative, and 6 opposed. Many of the supporting
48 letters favored some modification of the alternative to further protect the environment, while
49 those opposing this alternative did so because of lack of economic development (specifically in
50 Grant County), and putting the Wahuake Slope under Federal control. Two of these specifically
51 expressed support of the B Reactor museum. Several expressed that this was the most
52 balanced of the alternatives, providing both development and protection. (Total DOE's Preferred
53 Alternative = 33). RE028, RL024, RL025, RL032, RL039, RL098, RL106, RL120, RL121,
54 RL181, RL205, RL228, RL244, RL291, RL306, RL319, RL322, RL361, RL381, RL440, RL445,

1 RLM002, RLR002, RLR004, RTM008, RTM010, RTM011, RTP011, RTR001, RTR014, RTR021,
2 RTS003, RTS010
3

4 **DOE's Response:** The DOE has modified its Preferred Alternative in the Final HCP EIS in
5 response to these comments. The DOE believes that its new modified Preferred Alternative
6 gives the same balanced approach to future land development and protection of the
7 environment as did the DOE's Preferred Alternative in the Revised Draft HRA-EIS, while
8 supporting the DOE missions of Environmental Management (otherwise known as the "cleanup
9 mission") and science and technology at the Hanford Site. The B Reactor museum is retained in
10 DOE's Preferred Alternative in the Final HCP EIS. This alternative supports economic
11 development on a regional level, and protects the environment by placing a large portion of the
12 Hanford Site under management of the U.S. Fish and Wildlife Service (USFWS) as an overlay
13 wildlife refuge.
14

15 **F2.1.3 Alternative One**

16
17 Alternative One was the subject of 15 letters, with 14 in favor of this alternative and
18 1 opposed. Those in favor were particularly interested in the emphasis on preservation and the
19 additional protection that it provides for high value or sensitive ecological areas on the Hanford
20 Site, and the prohibition against agriculture, mining, grazing, and intensive recreational use that
21 would compromise the ecological and wildlife values presented. They felt the DOE's Preferred
22 Alternative as presented in the Revised Draft HRA-EIS did not go far enough in furthering this
23 goal. A desire to further protect the unique shrub-steppe habitat was also expressed. The
24 opposing letter expressed the need for some economic development, in addition to some
25 environmental protection. (Total Alternative One = 15). RL003, RL222, RL282, RL283, RL291,
26 RL322, RL340, RL352, RL439, RL445, RTP001, RTP011, RTR014, RTR015, RTR018
27

28 **DOE's Response:** While Alternative One does meet the goal of environmental protection, it
29 does not fulfill all of DOE's missions. These include planning for continuation of the primary
30 missions of the site and planning for future economic development. In response to public
31 comment, DOE has eliminated grazing and increased the area of preservation in its Preferred
32 Alternative in the Final HCP-EIS, while allowing industrial development on land used for, or
33 adjacent to, land already used for industrial-type functions. This supports the DOE mission of
34 Science and Technology. Mining areas are needed for the primary mission of the site, which is
35 Environmental Management (otherwise known as the "cleanup mission"). To the extent that a
36 significant portion of the Hanford Site can be shared with these two primary missions, these
37 areas would be placed under management of the USFWS, to be managed as an overlay wildlife
38 refuge.
39

40 **F2.1.4 Alternative Two**

41
42 Alternative Two was supported by 47 commenters, with 2 opposing the alternative. The
43 primary issue expressed in the supporting comments was the additional protection given to the
44 environment, particularly that afforded to the high value ecological areas and natural and
45 sensitive lands on the Hanford Site. Some commenters expressed the desire for even more
46 protection of the environment, citing this alternative as the one closest to total preservation and
47 restoration of the site. One commenter was supporting this alternative also because of the
48 alternative's support for the B Reactor museum. The two opposing commenters cited the lack of
49 any areas for economic development. (Total Alternative Two = 49). RE013, RL119, RL154,
50 RL159, RL185, RL226, RL230, RL264, RL270, RL283, RL286, RL287, RL288, RL291, RL295,
51 RL296, RL309, RL310, RL311, RL312, RL322, RL331, RL338, RL339, RL344, RL346, RL347,
52 RL356, RL358, RL445, RLS002, RLS003, RLS004, RTP007, RTP008, RTP013, OR014,
53 RTR019, RTS013, RTS016, RTS018, RTS002, RTS003, RTS004, S008, RTS009, RTS020,
54 RTS022, RTS025
55

1 **DOE's Response:** While Alternative Two does meet the goal of environmental protection, it
2 does not meet DOE's desires. These include planning for continuation of the primary missions
3 of the site, and planning for future economic development. In response to public comment, DOE
4 has eliminated grazing and increased the area of preservation in its Preferred Alternative in the
5 Final HCP-EIS, while allowing industrial development on land used for, or adjacent to, land
6 already used for industrial-type functions. This supports the DOE mission of science and
7 technology. Mining areas are needed for the primary mission of the site, which is Environmental
8 Management (otherwise known as the "cleanup mission"). To the extent that a significant
9 portion of the Hanford Site can be shared with these two primary missions, these areas would be
10 placed under management of the USFWS, to be managed as an overlay wildlife refuge.

11 12 **F2.1.5 Alternative Three**

13
14 Alternative Three was discussed by 69 commenters, with 12 in opposition to the
15 alternative and 57 in favor. Commenters who supported this alternative cited the need for
16 economic development of the land in Grant County (by turning the land over to farming). These
17 commenters felt that to be fair, the land should be given back to the farmers from whom it was
18 taken to create the Hanford Site in the 1940s. A comment was also made that the property tax
19 that would have been collected by the county would have gone into schools for children. These
20 commenters believed that Alternative Three supports environmental protection goals, and is
21 balanced between environmental protection and economic development. They supported
22 Alternative Three as the alternative which best represented the Wahuake 2000 Plan. Those
23 opposed to Alternative Three expressed the need for protection of the shrub-steppe habitat, and
24 the concern that irrigation would undermine the White Bluffs. (Total Alternative Three = 69).
25 RE028, RL100, RL120, RL131, RL200, RL220, RL222, RL258, RL285, RL291, RL297, RL298,
26 RL301, RL305, RL307, RL314, RL322, RL329, RL330, RL332, RL333, RL335, RL336, RL337,
27 RL340, RL341, RL345, RL348, RL349, RL350, RL351, RL354, RL358, RL372, RL373, RL374,
28 RL375, RL381, RL384, RL436, RL437, RL441, RL442, RL447, RLM003, RTM001, RTM002,
29 RTM003, RTM004, RTM005, RTM006, RTM007, RTM009, RTM011, RTM012, RTM014,
30 RTM015, RTM016, RTM017, RTM019, RTM020, RTM021, RTP007, RTP008, RTP011,
31 RTP013, RTR014, RTS001, RTS005

32
33 **DOE's Response:** While Alternative Three does have some aspects of balance, there is no
34 area set aside that is large enough to support DOE's Science and Technology Mission which
35 includes site stewardship. Alternative Three does support DOE's mission to provide economic
36 growth, and provides for the current and future missions of DOE on the Hanford Site. In the
37 DOE's Preferred Alternative in the Final HCP-EIS, there is a balance of development and
38 environmental protection. In a regional context, the area is served by both land area for
39 economic development and future missions, and by protecting a large area of shrub-steppe
40 habitat that supports many wildlife species, and provides an outdoor lifestyle.

41 42 **F2.1.6 Alternative Four**

43
44 Seven comments were received regarding Alternative Four. Five were in favor, and two
45 were against this alternative. The commenters opposing Alternative Four expressed concern
46 that there was no economic development allowed, while those in support cited either the
47 necessity of using the McGee Ranch silt in the cleanup effort as a modification, or support for
48 the large amount of preservation in this alternative. (Total Alternative Four = 7). RL270, RL291,
49 RL322, RL438, RTP011, RTS003, RTS012

50
51 **DOE's Response:** While Alternative Four does meet the goal of environmental protection, it
52 does not meet DOE's desires. These include planning for continuation of the primary missions
53 of the site and planning for future economic development. In response to public comment, DOE
54 has eliminated grazing and increased the area of preservation in its Preferred Alternative in the
55 Final HCP-EIS, while allowing industrial development on land used for, or adjacent to, land

1 already used for industrial-type functions. This supports the DOE mission of science and
2 technology. Mining areas are needed for the primary mission of the site, which is Environmental
3 Management (otherwise known as the "cleanup mission"). To the extent that a significant
4 portion of the Hanford Site can be shared with these two primary missions, these areas would be
5 placed under management of the USFWS, to be managed as an overlay wildlife refuge.
6

7 **F2.1.7 National Wildlife Refuge/DOE's Preferred Alternative**

8
9 More than 300 commenters wrote concerning the DOE's Preferred Alternative, with the
10 modification that a National Wildlife Refuge be created/expanded for additional protection of the
11 environment. Six commenters were against this combination, citing as their reasons the
12 USFWS's lack of adequate resources to properly manage the land, and the DOE's ignoring the
13 previous use in farming and future economic development. (Total Refuge/Preferred Alternative
14 = 306). RE001, RE002, RE003, RE004, RE006, RE007, RE009, RE010, RE014, RE015,
15 RE017, RE019, RE021, RE026, RE029, RL002, RL005, RL006, RL007, RL008, RL009, RL010,
16 RL011, RL012, RL013, RL014, RL015, RL016, RL017, RL018, RL019, RL020, RL021, RL022,
17 RL023, RL026, RL027, RL028, RL029, RL030, RL033, RL034, RL035, RL036, RL037, RL040,
18 RL041, RL042, RL043, RL044, RL045, RL046, RL048, RL049, RL051, RL052, RL053, RL055,
19 RL057, RL058, RL059, RL060, RL062, RL064, RL065, RL066, RL067, RL068, RL069, RL071,
20 RL072, RL074, RL076, RL077, RL078, RL079, RL080, RL081, RL082, RL083, RL084, RL085,
21 RL086, RL087, RL089, RL090, RL091, RL092, RL093, RL094, RL095, RL096, RL099, RL100,
22 RL101, RL102, RL103, RL104, RL105, RL107, RL109, RL110, RL111, RL112, RL114, RL115,
23 RL122, RL123, RL124, RL125, RL127, RL128, RL129, RL130, RL132, RL133, RL134, RL135,
24 RL136, RL137, RL138, RL139, RL140, RL141, RL142, RL145, RL148, RL149, RL150, RL151,
25 RL152, RL153, RL156, RL157, RL158, RL160, RL161, RL162, RL163, RL164, RL165, RL167,
26 RL168, RL170, RL172, RL173, RL174, RL175, RL177, RL179, RL180, RL183, RL184, RL186,
27 RL187, RL188, RL189, RL190, RL191, RL192, RL193, RL194, RL195, RL196, RL197, RL198,
28 RL203, RL204, RL207, RL208, RL209, RL211, RL213, RL214, RL215, RL216, RL217, RL218,
29 RL219, RL220, RL223, RL224, RL225, RL227, RL228, RL229, RL231, RL236, RL238, RL240,
30 RL241, RL242, RL243, RL245, RL246, RL247, RL248, RL249, RL252, RL253, RL254, RL255,
31 RL256, RL257, RL261, RL262, RL266, RL267, RL268, RL269, RL271, RL272, RL273, RL274,
32 RL275, RL276, RL277, RL278, RL279, RL280, RL281, RL288, RL289, RL291, RL294, RL300,
33 RL302, RL314, RL315, RL316, RL320, RL321, RL323, RL326, RL327, RL340, RL342, RL352,
34 RL353, RL355, RL359, RL360, RL362, RL363, RL364, RL365, RL366, RL367, RL368, RL369,
35 RL370, RL376, RL377, RL378, RL379, RL380, RL382, RL383, RL443, RL444, RL445, RL448,
36 RL450, RL451, RLR001, RLR003, RLR005, RLR006, RLS005, RTM001, RTM004, RTM005,
37 RTM007, RTM010, RTP004, RTP006, RTP011, RTP012, RTR002, RTR005, RTR006, RTR007,
38 RTR008, RTR009, RTR010, RTR011, RTR012, RTR013, RTR014, RTR016, RTR019, RTR024,
39 RTR026, RTS001, RTS002, RTS003, RTS006, RTS007, RTS009, RTS014, RTS015, RTS016,
40 RTS018, RTS019, RTS020, RTS024
41

42 **DOE's Response:** The DOE has proposed a Preferred Alternative in the Final HCP-EIS which
43 embraces this combination of economic development, future missions, and environmental
44 protection. The USFWS would be given the responsibility to manage the Wahluke Slope, the
45 Hanford Reach (including the islands outside of Benton County), McGee Ranch, the riverlands,
46 and the Arid Lands Ecology (ALE) Reserve as an overlay wildlife refuge, while DOE retains
47 ownership of the land.
48

49 **F2.1.8 Other Combinations**

50
51 More than 100 comments expressed concern or support for parts of alternatives or
52 additional alternatives. A few commenters submitted alternative maps they had made
53 themselves for DOE's consideration. Some commenters addressed specifically the issue of
54 local versus Federal control. A few supported an extension to the public comment period. Two
55 commenters suggested that additional mapping be done to better represent the wildlife

1 population picture. Others suggested that cleanup, not planning, be the focus of the mission at
2 the Hanford Site. These "other combinations" comments are summarized below. (Total Other
3 Combo = 118). RE004, RE005, RE008, RE012, RE015, RE016, RE020, RE022, RE023,
4 RE024, RE025, RE027, RE030, RL001, RL031, RL038, RL047, RL054, RL056, RL070, RL073,
5 RL097, RL108, RL117, RL118, RL143, RL144, RL152, RL166, RL169, RL176, RL181, RL182,
6 RL197, RL199, RL200, RL201, RL202, RL205, RL206, RL210, RL226, RL230, RL232, RL234,
7 RL235, RL237, RL239, RL240, RL241, RL248, RL249, RL251, RL259, RL260, RL263, RL270,
8 RL282, RL283, RL284, RL285, RL289, RL290, RL297, RL298, RL299, RL301, RL303, RL304,
9 RL305, RL306, RL308, RL309, RL311, RL313, RL314, RL317, RL318, RL319, RL321, RL322,
10 RL325, RL328, RL329, RL330, RL332, RL333, RL334, RL335, RL336, RL337, RL341, RL344,
11 RL345, RL347, RL349, RL350, RL351, RL356, RL357, RL358, RL361, RL371, RL373, RL381,
12 RL384, RLM001, RLM002, RLP001, RLS001, RLS004, RTM003, RTM018, RTM021, RTP004,
13 RTP006, RTP014, RTR009

14
15 **Local Control vs. Federal Control.** Many commenters were concerned about the issue of local
16 control versus Federal control of the land that currently comprises the Hanford Site. Overall, 65
17 commenters cited this issue, with 37 preferring Federal control and 28 preferring local control.

18
19 **DOE's Response:** The Federal government would likely retain control of the entire Hanford Site
20 for the next 50 years, during which time it would be managed by a Federal agency. The DOE
21 has proposed that the USFWS manage a large portion of the Hanford Site as an overlay wildlife
22 refuge, while the current ownership remains under Federal control. Therefore, the decision
23 being made at this time is not whether the Federal government is relinquishing ownership of the
24 land, but instead, the decision of how to manage the land until such time that the land is
25 considered surplus.

26
27 **Extension to the Public Comment Period.** Three commenters requested a longer comment
28 period.

29
30 **DOE's Response:** The DOE carefully considered the appropriate comment period length and
31 came to the decision that the NEPA-required 45 days was adequate. This decision was based
32 on several factors. These include the extended public comment period for the original Draft EIS
33 in 1996, and the fact that this is a revised draft of a descoped document. From the time the first
34 draft was issued in August 1996, to April 1999, extensive work was done with the participation of
35 the nine cooperating agencies to prepare a Revised Draft EIS that demonstrated many
36 perspectives of the land-use decision at the Hanford Site. The alternatives developed
37 encompassed the values and goals of many diverse groups within the region.

38
39 **Prioritizing Cleanup.** Six commenters urged DOE to keep cleanup efforts as its top priority,
40 and not allow land-use planning questions to delay any of the cleanup work.

41
42 **DOE's Response:** The DOE recognizes the cleanup work at Hanford as its primary mission
43 and it is that cleanup mission that is the reason to implement a land-use plan which does not
44 address individual cleanup sites, but looks at the entire Hanford Site instead.

45
46 **Customized Alternatives.** Approximately 100 letters cited support for parts of alternatives, or
47 the comment writer's own alternative. By an overwhelming majority, the support for more
48 preservation was expressed, ranging from more protection of the entire Hanford Site, to support
49 for additional wildlife refuge land. The commenters supporting local control cited the need for
50 agriculture on the Wahluke Slope.

51
52 **DOE's Response:** The DOE has modified its Preferred Alternative in the Final HCP-EIS in
53 response to these comments. The new Preferred Alternative embraces additional wildlife refuge
54 acreage, yet retains economic development, planning for potential future site missions, and
55 recreational opportunities on the Hanford Site.

1 **Wildlife Mapping.** Two commenters suggested that additional wildlife mapping be done to
2 several of the maps in the Revised Draft HRA-EIS, to more accurately reflect the Hanford Site's
3 current wildlife populations.
4

5 **DOE's Response:** The maps (figures) included in the Final HCP-EIS have been labeled with
6 the caveat that any wildlife population map cannot be completely accurate, since nesting and
7 burrowing sites vary from season to season and year to year.
8

9 **Wahluke 2000 Plan.** Ten commenters supported the Wahluke 2000 Plan as an alternative that
10 was not considered by the Revised Draft HRA-EIS. These commenters expressed concern that
11 even the land use described in Alternative Three was not as balanced as the Wahluke 2000
12 Plan. The commenters also cited that the Wahluke 2000 Plan had already gone through a
13 public process.
14

15 **DOE's Response:** The DOE worked with the Grant and Franklin County Planning Departments
16 as cooperating agencies on preparation of the Revised Draft HRA-EIS and, subsequently, on
17 preparation of this Final HCP EIS. The basis for the Wahluke Slope planning was the Wahluke
18 2000 Plan, as it was sent to Mr. Ron Izatt, then Director of the Environmental Restoration
19 Division for the Department of Energy Richland Operations Office, on November 18, 1992, from
20 Mr. Mark Hedman, representing the Wahluke 2000 Committee. The only difference between the
21 map submitted then, and the map presented in Alternative Three of the Revised Draft HRA-EIS
22 is the inclusion of wetlands protection as required by state and Federal regulations.
23

24 **F2.1.9 Preservation**

25
26 Several commenters expressed their support for preservation of the Hanford Site. Fifty-
27 eight letters supported preservation in some aspect, although the amount of preservation cited
28 varied from the addition of the 200 West Area sagebrush, to preservation of the entire Hanford
29 Site. Many cited the Hanford Reach, the creation of a National Wildlife Refuge, McGee Ranch,
30 May Junction, the islands, the LIGO land (when LIGO is complete), Gable Mountain, Gable
31 Butte, and the sand dunes. Reasons cited were historical, ecological, cultural, biological, and
32 economic. Some commenters thought there was enough preservation already. (Total
33 Preservation = 58). RE018, RE020, RL004, RL016, RL029, RL040, RL050, RL061, RL063,
34 RL074, RL088, RL102, RL113, RL116, RL119, RL123, RL126, RL146, RL171, RL178, RL204,
35 RL206, RL212, RL243, RL250, RL265, RL282, RL283, RL288, RL289, RL291, RL299, RL302,
36 RL322, RL326, RL355, RL358, RL360, RL367, RL439, RL440, RL443, RL445, RLR001,
37 RLR003, RLR004, RTP005, RTP012, RTR015, RTR017, RTR018, RTR021, RTR022, RTR023,
38 RTR025, RTS008, RTS010, RTS019
39

40 **DOE's Response:** It is because of the need to protect the environment (e.g., meeting DOE's
41 policy as a Natural Resource Trustee), that acreage for preservation was considered a high
42 priority. Many of the plants and animals on the Hanford Site need large expanses of land to
43 survive. The DOE's Preferred Alternative in the Final HCP-EIS protects and preserves the
44 environment by placing a large portion of the Hanford Site under management of the USFWS as
45 an overlay wildlife refuge.
46

47 **F2.1.10 Conservation (Mining)**

48
49 Of the 149 commenters expressing a view on Conservation (Mining), only 11 felt that no
50 mining at all should be allowed on the Hanford Site. The overwhelming majority felt that some
51 mining could be allowed but only for the necessary materials for the cleanup of the Hanford Site.
52 Some suggested that mining areas should be reclaimed and transferred into the Refuge after
53 the cleanup mission. One commenter wanted the definition of mining in the Final HCP EIS to
54 state that no removal of ore bodies or extraction of precious minerals would be included in the
55 mining activity. Ten letters described specific areas that should not be mined (primarily the ALE

1 Reserve), while one commenter cited the need for McGee Ranch silt specifically for the cleanup
2 program. (Total Conservation [Mining] = 149). RE006, RE007, RE009, RE010, RE014, RE017,
3 RE019, RE020, RE021, RE026, RL002, RL009, RL014, RL027, RL042, RL051, RL068, RL076,
4 RL077, RL085, RL086, RL092, RL095, RL099, RL100, RL103, RL107, RL112, RL114, RL115,
5 RL120, RL121, RL124, RL125, RL136, RL139, RL141, RL148, RL149, RL154, RL155, RL162,
6 RL167, RL170, RL172, RL173, RL174, RL179, RL180, RL184, RL185, RL186, RL187, RL188,
7 RL189, RL190, RL191, RL192, RL196, RL197, RL203, RL206, RL207, RL213, RL217, RL220,
8 RL222, RL224, RL225, RL226, RL229, RL230, RL236, RL238, RL239, RL242, RL243, RL249,
9 RL252, RL253, RL254, RL255, RL256, RL261, RL262, RL266, RL271, RL273, RL274, RL275,
10 RL277, RL279, RL280, RL281, RL282, RL283, RL289, RL294, RL309, RL314, RL320, RL326,
11 RL327, RL338, RL339, RL340, RL342, RL343, RL344, RL346, RL355, RL360, RL362, RL366,
12 RL368, RL371, RL376, RL379, RL438, RL443, RL446, RL448, RL450, RL451, RLR003,
13 RLR004, RLR005, RLR006, RTP005, RTP006, RTP007, RTP008, RTP011, RTP012, RTR002,
14 RTR005, RTR006, RTR008, RTR012, RTR016, RTR019, RTR022, RTS002, RTS010, RTS013,
15 RTS016, RTS017, RTS018, RTS019

16
17 **DOE's Response:** The total Conservation acreage (Conservation [Mining and Grazing] and
18 Conservation [Mining]) in the DOE's Preferred Alternative is approximately the same in the Final
19 HCP-EIS as it was in the Revised Draft HRA-EIS. However, in response to public comment, the
20 definition of mining has been modified to clarify what type of mining might be allowed. The new
21 definition specifies that mining on the Hanford Site must first undergo a permit application
22 process to determine need, and that only governmental mining would be allowed. The DOE
23 needs mineral resources to adequately perform the cleanup mission, and the State of
24 Washington needs mining capability to maintain the state highway that runs through the Hanford
25 Site. DOE has just converted its first gravel pit near the river into a wetland as a reclamation
26 project and intends to complete some type of reclamation when finished at the major mining
27 areas. No commercial mining would be allowed on the Hanford Site. Big Bend Alberta Mining
28 Company, which currently holds mining rights on about 518 ha (1,280 ac) on the ALE Reserve,
29 is not under the control of DOE.

30 31 **F2.1.11 Conservation (Mining and Grazing)**

32
33 More than 200 commenters were against allowing any commercial grazing on the
34 Hanford Site. Many commenters cited grazing as being incompatible with wildlife protection.
35 One commenter specifically mentioned the adverse impact on the elk population if fences were
36 put up to contain livestock. The spreading of noxious weeds was also attributed to livestock
37 grazing, because hoofs tear up the delicate ground cover habitat. There was a concern for
38 possible plutonium contamination, and it was expressed that livestock grazed on the Hanford
39 Site would be bad perceptually for all of Washington State agriculture. Three commenters
40 supported limited grazing, or supported local control instead of this being a Federal decision.
41 (Total Conservation [Mining and Grazing] = 240). RE006, RE007, RE009, RE010, RE014,
42 RE017, RE019, RE020, RE021, RE023, RE026, RL002, RL004, RL005, RL006, RL007, RL008,
43 RL009, RL012, RL013, RL014, RL015, RL016, RL017, RL018, RL019, RL020, RL021, RL023,
44 RL026, RL027, RL028, RL029, RL032, RL034, RL036, RL037, RL038, RL039, RL040, RL041,
45 RL042, RL043, RL045, RL049, RL051, RL055, RL057, RL058, RL059, RL060, RL062, RL064,
46 RL065, RL067, RL068, RL072, RL074, RL076, RL077, RL084, RL085, RL086, RL087, RL092,
47 RL095, RL099, RL100, RL101, RL103, RL107, RL112, RL114, RL115, RL119, RL120, RL121,
48 RL124, RL125, RL136, RL139, RL140, RL141, RL145, RL148, RL149, RL153, RL154, RL157,
49 RL158, RL161, RL163, RL164, RL165, RL167, RL168, RL170, RL172, RL173, RL174, RL175,
50 RL176, RL177, RL178, RL179, RL180, RL181, RL184, RL185, RL186, RL187, RL188, RL189,
51 RL190, RL191, RL192, RL196, RL197, RL198, RL203, RL204, RL206, RL207, RL208, RL210,
52 RL212, RL213, RL217, RL218, RL219, RL220, RL224, RL225, RL226, RL227, RL229, RL230,
53 RL236, RL238, RL239, RL242, RL243, RL249, RL252, RL253, RL254, RL255, RL256, RL261,
54 RL262, RL266, RL267, RL268, RL269, RL271, RL273, RL274, RL275, RL277, RL279, RL280,
55 RL281, RL282, RL283, RL288, RL289, RL292, RL293, RL294, RL296, RL302, RL309, RL312,

1 RL314, RL320, RL326, RL327, RL338, RL339, RL340, RL342, RL343, RL344, RL346, RL355,
2 RL356, RL360, RL362, RL366, RL368, RL369, RL371, RL376, RL379, RL383, RL438, RL439,
3 RL443, RL445, RL448, RL449, RL450, RL451, RLR001, RLR003, RLR004, RLR005, RLR006,
4 RLS002, RLS005, RTP004, RTP005, RTP006, RTP007, RTP008, RTP010, RTP011, RTP012,
5 RTP013, RTR002, RTR003, RTR004, RTR005, RTR006, RTR007, RTR008, RTR010, RTR011,
6 RTR012, RTR014, RTR016, RTR019, RTR022, RTS002, RTS010, RTS013, RTS016, RTS017,
7 RTS018, RTS019

8
9 **DOE's Response:** In response to the strong public sentiment on this issue, DOE has
10 eliminated grazing from its Preferred Alternative in the Final HCP-EIS. In doing so, DOE
11 considered the effects of grazing on the wildlife habitat, including the potential for the spread of
12 noxious weeds when livestock hooves damage the ground cover. The land-use definition of
13 Conservation (Mining and Grazing) was included in DOE's Preferred Alternative in the Revised
14 Draft HRA-EIS to accommodate a grazing permit granted by the State of Washington for the
15 Wahluke State Wildlife Recreation Area. The state allowed this permit to expire on
16 December 31, 1998.

17 18 **F2.1.12 Low-Intensity Recreation**

19
20 Twenty-five letters addressed Low-Intensity Recreation on the Hanford Site. Eight
21 commenters supported boat launches. Four of these supported a boat launch only at Vernita
22 and not at White Bluffs, while four supported a boat launch at both locations (although one
23 stated the boat launch at White Bluffs should be moved downstream of the White Bluffs
24 townsite). Seven commenters opposed a boat launch at White Bluffs, citing the need to
25 minimize damage to the bluffs. Two commenters opposed recreation of any type on the Hanford
26 Site. Several expressed the view that only non-motorized vehicles or recreation be allowed on
27 constructed trails. Several others supported access for limited recreation citing, as examples,
28 camp sites for paddlers and access for kayakers and rafters. (Total Low-Intensity Recreation =
29 25). RL104, RL120, RL154, RL159, RL181, RL185, RL204, RL206, RL222, RL225, RL230,
30 RL242, RL243, RL249, RL296, RL314, RL346, RL355, RL360, RL438, RL440, RLR004,
31 RTP010, RTR006, RTS019

32
33 **DOE's Response:** When the cooperating agencies looked at expanding recreational
34 opportunities along the Columbia River (e.g., boat launches at Vernita and the White Bluffs), two
35 resources areas – biological and cultural – were always scrutinized. The White Bluffs boat
36 launch has cultural significance that would be best preserved by continued operation of the old
37 ferry launches on both sides of the river. Further, establishing a new boat launch would most
38 likely impact existing tribal cultural resources. The two Hanford avian species that are currently
39 protected under the *Environmental Species Act* (ESA) have been placed in the delisting process
40 and will be removed in one to two years. Those Hanford species left on the ESA are three
41 fishes that could be impacted by installation of a new boat ramp near the Vernita Bridge. This
42 type of balancing between resource protection issues and greater access to those resources is
43 why advice from the Site Planning Advisory Board (SPAB) (see Chapter 6) would be so valuable
44 to DOE.

45 46 **F2.1.13 High-Intensity Recreation**

47
48 Thirty-two comments were received regarding High-Intensity Recreation. Twelve were
49 opposed to this land-use designation, while of the twenty in favor, most were in support of the
50 B Reactor museum proposal. One commenter supporting the designation disagreed with
51 closing off recreational opportunities (river access, for example) for 50 years, while another letter
52 expressed support for recreational opportunities in general. One letter expressed the view that
53 no High-Intensity Recreation should be allowed. (Total High-Intensity Recreation = 32). RL042,
54 RL147, RL159, RL170, RL179, RL185, RL204, RL206, RL221, RL225, RL242, RL243, RL249,
55 RL266, RL282, RL314, RL339, RL342, RL344, RL346, RL355, RL440, RL445, RTM009,

1 RTP003, RTP005, RTP007, RTP010, RTP011, RTR001, RTR006, RTS019, RE028, RL046,
2 RL185, RL201, RL204, RL206, RL230, RL288, RL296, RL314, RL343, RL347, RL360, RL445,
3 RTR012

4
5 **DOE's Response:** One of the assumptions DOE used in developing its Preferred Alternative
6 was that the public would support preservation of the Manhattan Project's historical legacy
7 consistent with the B Reactor Museum Association's proposal. The public validated this
8 assumption by supporting the B Reactor Museum proposal during the public comment period on
9 the Revised Draft HRA-EIS. The B Reactor would be designated High-Intensity Recreation to
10 allow tourism of the Federally registered landmark. The High-Intensity Recreation area near
11 Vernita Bridge (where the current Washington State rest stop is located) would be expanded
12 across State Highway 240 and to the south to include a boat ramp and other visitor-serving
13 facilities. Because of DOE Environmental Restoration operational concerns, a boat dock at the
14 B Reactor would not be permitted until the Environmental Restoration activities were completed.
15 However, upon completion of the ER efforts, the B Reactor Museum Association could apply for
16 the appropriate permits to construct a boat dock. Rail access to the site would not be hindered
17 by DOE's Preferred Alternative because the extant rail lines are considered pre-existing
18 nonconformances.

19 20 **F2.1.14 Research and Development**

21
22 Letters received on this land-use designation cited the need for restricting or prohibiting
23 Research and Development. Two letters expressed the view that this land use would be too
24 costly and too speculative at this time. Suggestions to limit Research and Development to the
25 300 Area, LIGO, and FFTF were made. One commenter discussed the need for the EIS to
26 distinguish between large-scale R&D and smaller scale, time-limited activities that would, by
27 their nature, consume less resources. (Total Research and Development = 15). RE028, RL046,
28 RL185, RL201, RL204, RL206, RL230, RL288, RL296, RL343, RL347, RL360, RL445, RTR012

29
30 **DOE's Response:** The DOE considered the need for Research and Development land use on
31 the Hanford Site and included in its Preferred Alternative in the Final HCP EIS an appropriate
32 amount of acreage to provide for any potential future missions for the Hanford Site as well as
33 economic development. The Research and Development land-use areas in the HCP EIS are
34 adjacent to, or on areas currently used for activities similar to, or the same as potential future
35 uses. This land-use designation reflects the DOE mission of science and technology as well as
36 economic development.

37 38 **F2.1.15 Industrial**

39
40 Thirty-five commenters addressed the Industrial land-use designation. Some
41 recommended limiting industrial development to the 300 Area and 1100 Area, or areas near the
42 Tri-Cities, which could support the industry with infrastructure. One commenter suggested that a
43 corridor from Energy Northwest (formerly WPPSS) south to the 300 Area. Some expressed that
44 timing was important, that cleanup proceed first, then development, and that existing high-
45 density industrial areas should be filled up first, before expanding land use. One commenter
46 made it clear that industrial development occur only where a documented need exists. A few
47 commenters were against any further industrial development on the Hanford Site. (Total
48 Industrial = 35). RE023, RL174, RL179, RL181, RL204, RL206, RL225, RL230, RL233, RL242,
49 RL249, RL288, RL289, RL314, RL319, RL320, RL322, RL326, RL342, RL343, RL344, RL349,
50 RL355, RL358, RL360, RL443, RL445, RLR001, RTM008, RTP001, RTP005, RTR006,
51 RTR010, RTR011, RTR012

1 **DOE's Response:** The need for the Industrial land-use designation is to support the DOE
2 missions of science and technology and Environmental Management (i.e., the cleanup mission).
3 The industrial areas would not be developed at the expense of the cleanup mission, in either
4 budget or schedule. The land designated as Industrial would be developed only with a strategy
5 that embraces development along with the infrastructure to support it.
6

7 **F2.1.16 Industrial-Exclusive**
8

9 Several commenters stated that the Industrial-Exclusive use area as shown in the
10 Revised Draft Preferred Alternative should be reconfigured to represent what was shown for
11 Industrial-Exclusive in Alternatives One and Two. Specifically, they felt the small western
12 extension of the 200 Areas should be Preservation. (Total Industrial-Exclusive = 9). RL174,
13 RL179, RL204, RL206, RL314, RL343, RL344, RL445, RTR006
14

15 **DOE's Response:** Preservation was only applied if there was some combination of exceptional
16 resource values (e.g., biological, cultural, and edaphic). This approach allowed Preservation to
17 be applied to the saline vernal pools, the sodic soil greasewood community, the sand dune
18 dependent Indian rice grass community, and other location dependent communities. Still, not all
19 areas with exceptional vegetational structure (e.g., the 200 West Area sagebrush stands) are
20 considered appropriate of the Preservation designation. The presence of sagebrush in the 200
21 Areas could interfere with DOE's conducting one of its primary missions and there is no
22 combination of values that would elevate the 200 Area sagebrush into a Preservation
23 designation.
24

25 **F2.1.17 Agriculture**
26

27 Over 200 commenters addressed Agriculture as a land use. More than 180 were
28 opposed to any agriculture on the Hanford Site, citing the possible endangering of the health of
29 the Columbia River from irrigation runoff, the potential damage to the White Bluffs from
30 irrigation, the need for preservation of the shrub-steppe habitat for wildlife, and the possibility
31 that agriculture on the Hanford Site would be bad, perceptually, for all Washington State
32 agriculture. The 20 letters in support of agriculture cited the need to support world food
33 production, schools (with the resultant taxes), and the rural area in Grant County in need of
34 economic growth. (Total Agriculture = 202). RE004, RE006, RE014, RE017, RE019, RE020,
35 RE021, RE023, RE026, RE029, RL004, RL005, RL006, RL007, RL008, RL012, RL013, RL015,
36 RL016, RL017, RL018, RL019, RL020, RL021, RL023, RL025, RL026, RL028, RL029, RL032,
37 RL034, RL036, RL037, RL038, RL039, RL040, RL041, RL042, RL043, RL044, RL045, RL049,
38 RL055, RL056, RL057, RL058, RL059, RL060, RL062, RL064, RL065, RL067, RL070, RL072,
39 RL074, RL076, RL077, RL084, RL086, RL090, RL092, RL094, RL095, RL099, RL101, RL107,
40 RL112, RL114, RL115, RL117, RL121, RL125, RL131, RL136, RL139, RL140, RL142, RL145,
41 RL148, RL153, RL156, RL157, RL158, RL159, RL161, RL162, RL163, RL164, RL168, RL174,
42 RL175, RL176, RL178, RL179, RL180, RL181, RL182, RL185, RL186, RL187, RL188, RL189,
43 RL190, RL191, RL192, RL194, RL196, RL198, RL206, RL208, RL210, RL212, RL213, RL217,
44 RL218, RL219, RL221, RL223, RL224, RL225, RL227, RL229, RL230, RL236, RL238, RL239,
45 RL242, RL243, RL250, RL252, RL253, RL254, RL255, RL258, RL261, RL266, RL269, RL271,
46 RL280, RL283, RL284, RL289, RL307, RL312, RL314, RL320, RL321, RL326, RL327, RL330,
47 RL339, RL340, RL342, RL343, RL346, RL355, RL356, RL362, RL363, RL369, RL371, RL376,
48 RL379, RL384, RL439, RL451, RLM003, RLR001, RLS005, RTM001, RTM002, RTM004,
49 RTM005, RTM007, RTM009, RTM010, RTM013, RTM015, RTM017, RTM019, RTP003,
50 RTP004, RTP008, RTP011, RTR002, RTR003, RTR004, RTR011, RTR012, RTR013, RTR014,
51 RTR016, RTR018, RTR019, RTR020, RTR024, RTS007, RTS011, RTS013, RTS017, RTS018,
52 RTS019
53

54 **DOE's Response:** In its Preferred Alternative in the Final HCP EIS, DOE would preclude any
55 agriculture on the Hanford Site. In keeping with its policy as a Natural Resource Trustee, DOE

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has placed some farmland close to the refuge.
refuge.

F2.1.18 Policy

Forty-one letters relating to policy were received. Half of these addressed the payment in lieu of taxes (PILT), expressing that future payments should be based on lost opportunity instead of current use, and that these payments are important to providing equal educational opportunity to the children of Grant County. Two commenters wanted to add to the Policy Statement in Chapter 6 regarding protection and preservation of environmental resources. One commenter wanted the *Hanford Strategic Plan* to go out for public review. One commenter wanted it noted that there are groundwater and basaltic problems in the area by the river. One commenter expressed a concern that land-use planning should not be used to drive cleanup standards. Another commenter wanted DOE to remain open to the idea of bartering as a way to reach agreement on land use. A summary of comments received under the "policy" category are listed below. (Total Policy = 41). RL154, RL204, RL233, RL297, RL298, RL301, RL303, RL307, RL329, RL332, RL333, RL335, RL336, RL337, RL350, RL351, RL441, RL445, RL447, RLM003, RTM001, RTM004, RTM005, RTM006, RTM010, RTM011, RTM012, RTM016, RTM017, RTM020, RTP001, RTP002, RTP003, RTP009, RTR012, RTS004, RTS006, RTS009, RTS012, RTS022, RTS023

PILT Payments. Twenty letters were received addressing the payment of PILT to Grant County. Fourteen of these cited the need to base future PILT payments on lost opportunity instead of current land use. The remaining 6 letters cited the need for Grant County to receive PILT and the importance of PILT to schools. One commenter cited the preference for opportunity, instead of entitlement.

DOE's Response: Because DOE has chosen to work with the USFWS to manage the proposed wildlife refuge as an "overlay refuge," DOE would retain land ownership which, in turn, would maximize the PILT payments to the affected counties. (The DOE pays about 10 times what DOI pays.)

The Grant County Assessor determined the value of developed farmland by computing the average assessed value per acre for personal property, improvements, and land and trees, to arrive at a total average of \$3,091.67. Personal property includes farm machinery and equipment, including above ground irrigation systems. Improvements include the value of farmhouses and farm buildings, including sheds, warehouses, cold storage, etc. Land includes the value of land, plus underground irrigation systems. Trees include the value of orchards, vineyards, etc. In addition, the assumption was made that 33,000 acres, or 94 percent of the irrigable or previously irrigated land under DOE control in Grant County would be developed farmland to arrive at a total estimated taxable value of \$102 million.

One commenter said he believes there is an inequality since DOE only pays PILT based upon the value of land (\$1,225 an acre for irrigable land) and does not include additional values listed above. This commenter's computation of PILT does not comply with DOE's PILT policies and is not equitable, considering DOE uses very little of the services provided by the County. If the land were transferred, individuals living on and farming the land would require significantly more services by the County, the additional cost of which would probably be more than the additional taxes, collected. The assumption that 33,000 acres would be developed is an aggressive one. The Grant County Assessor has assumed only 27,000 acres would be developed farmland. The same conditions are set forth in signed intergovernmental agreements with Benton and Franklin Counties and PILT is being consistently applied.

1 **Continuation of Cleanup.** Five commenters reiterated the need for continuation of the cleanup
2 mission.
3

4 **DOE's Response:** The DOE considers the cleanup mission at Hanford to be its primary
5 mission, and the land-use planning effort is complementary to and not in conflict with that
6 mission. In fact, the land-use plan would facilitate the cleanup mission.
7

8 **Human Health and Safety.** Commenters cited the need to consider human health and safety,
9 since parts of the Hanford Site would be contaminated for a long time, if not forever.
10

11 **DOE's Response:** The DOE has taken into consideration that cleanup would take years to
12 complete to an acceptable level. This land-use plan would enable regulators to set cleanup
13 standards to levels commensurate with the land use planned at each cleanup site.
14

15 **Environmental Justice:** Some commenters stated that DOE did not adequately address the
16 Environmental Justice impact caused by not expanding farming opportunities on the Wahluke
17 Slope to Hispanic agricultural workers.
18

19 **DOE's Response:** On February 11, 1994, the President issued Executive Order 12898
20 (59 Fed. Reg. 7629, 1994), *Federal Actions to Address Environmental Justice in Minority*
21 *Populations and Low-Income Populations*. This Executive Order directs each Federal agency to
22 make environmental justice part of the agency mission. To the greatest extent practicable and
23 permitted by law, Federal agencies must identify and address disproportionately high and
24 adverse human health or environmental effects of their programs, policies, and activities on
25 minority populations and low-income populations.
26

27 As stated in the President's February 11, 1994 memorandum that accompanied the Executive
28 Order, "Each Federal agency shall analyze the environmental effects, including human health,
29 economic, and social effects, of Federal actions, including effects on minority communities and
30 low-income communities, when such analysis is required by NEPA (42 USC Section 4321,
31 et seq.). Mitigation measures outlined or analyzed in an environmental assessment,
32 environmental impact statement, or record of decision, whenever feasible, should address
33 significant and adverse environmental effects of proposed Federal actions on minority
34 communities and low-income communities." The memorandum and Executive Order ensure
35 that minority and low-income communities will have a voice in the development and
36 implementation of any Federal action that might adversely affect those communities.
37

38 In addition, the memorandum and Executive Order indicate that all Federal agencies are to be
39 proactive in identifying and, to the extent practicable, mitigating any potential disproportionately
40 high and adverse impacts on minority and low-income communities that could result from
41 proposed Federal actions.
42

43 In order to implement the provisions of Executive Order 12898, the *U.S. Department of Energy*
44 *Environmental Justice Strategy, Executive Order 12898* (DOE 1995a) was prepared. Guidance
45 provided in this publication, as well as CEQ's *Environmental Justice Guidance under NEPA*
46 (March 1998), and EPA's *Guidance for Incorporating Environmental Justice Concerns in EPA's*
47 *NEPA Compliance Analyses* (April 1998) were used, to the extent practicable, in the Revised
48 Draft HRA-EIS.
49

50 Because the proposed action for the Wahluke Slope is Preservation, there would no impacts to
51 the Hispanic population because no changes would be made to the current use of the lands.
52 Preservation is consistent with the wishes of the two Tribal Nations who served as consulting
53 Tribal governments for this EIS, and who represent the minority and low-income communities
54 who would be most directly affected by the proposed Federal action.
55

1 **F2.1.19 Procedure**
2

3 Several letters had comments regarding membership of the Site Planning Advisory Board
4 (SPAB). The SPAB could be established upon adoption of the Comprehensive Land-Use Plan
5 in the HCP EIS Record of Decision. The inclusion of equal seats for: 1) each Tribe as a
6 sovereign nation, 2) regulators, 3) the National Marine Fisheries Service, 4) the National Science
7 Foundation, and 5) the Washington State Department of Ecology; and less seats for the
8 counties were offered by six commenters as improvements to the SPAB membership as
9 described in the Revised Draft HRA-EIS (Chapter 6). Two commenters wanted the name of the
10 document changed to better reflect the emphasis on land-use planning. Several commenters
11 expressed the opinion that the Secretary of Energy's announcement in April 1999 of the Revised
12 Draft's Preferred Alternative prejudiced the outcome. One commenter noted that cultural
13 reviews should be prepared before land use is designated. One commenter would like the DOE
14 to slow down the decision, and one would like to speed up the decision. One commenter noted
15 that all land-use plans must support and preserve natural resources. A more detailed
16 description of these comments, along with DOE's responses, are listed below. (Total Procedure
17 = 11). RL124, RL154, RL204, RL290, RL292, RL293, RL446, RTM018, RTP013, RTP003,
18 RTS004
19

20 **SPAB Membership.** Commenters cited concerns regarding membership of the SPAB.
21

22 **DOE's Response:** As presented in the Final HCP EIS, the makeup of the SPAB would be the
23 nine cooperating agencies that participated in the preparation of the Revised Draft HRA-EIS and
24 development of the land-use alternatives. However, membership is not necessarily fixed. As an
25 advisory board, the board would support DOE by reviewing and providing advice for Area
26 Management Plans and Resource Management Plans, providing policy advice to DOE in areas
27 involving coordination of land and resource management, and advising DOE during
28 consideration of nonconforming proposals within the boundary of the Hanford Site.
29

30 **Predecisional Announcement.** Some commenters felt the outcome of the public review had
31 been prejudiced by the Secretary of Energy's announcement in April 1999 of the DOE's
32 Preferred Alternative prior to the document being published and in the hands of the public.
33

34 **DOE's Response:** The Secretary's announcement is consistent with the NEPA process and
35 consistent with the DOE's Preferred Alternative. The DOE has indicated in previous drafts of the
36 EIS its support for the proposal to expand the wildlife refuge to include the entire Wahluke Slope
37 and management of the Wahluke Slope for Preservation. The Secretary's announcement
38 supported the DOE's Preferred Alternative proposed in the Revised Draft HRA-EIS.
39 Management of the entire Wahluke Slope for Preservation is consistent with the ROD for the
40 DOI Hanford Reach EIS issued in 1996.
41

42 The DOE has both the right and the responsibility under NEPA to identify the agency's Preferred
43 Alternative. Federal NEPA regulations under 40 CFR 1502.14(e) require the Agency to
44 "...identify the agency's preferred alternative or alternatives, if one or more exists, in the draft
45 statement and identify such alternative in the final statement unless another law prohibits the
46 expression of such as preference." The Secretary's announcement is consistent with the
47 Preferred Alternative in the Final HCP EIS.
48

49 The DOE does not believe that the Secretary's announcement has in any way prejudiced the
50 outcome of the HCP EIS or the development of the NEPA ROD. The DOE has repeatedly
51 expressed its support for management of the Wahluke Slope for Preservation, beginning in 1994
52 when the DOE concurred in the Hanford Reach EIS.
53

1 **Name Change:** Commenters wanted a name change for the document.
2

3 **DOE's Response:** During the public review and comment period on the Revised Draft HRA-
4 EIS, DOE solicited public input on a proposed name change for the EIS document to better
5 reflect its purpose. The DOE proposed changing the name from the *Hanford Remedial Action*
6 *Environmental Impact Statement and Comprehensive Land-Use Plan* (HRA-EIS) to the *Hanford*
7 *Comprehensive Land-Use Plan Environmental Impact Statement* (HCP EIS). The public
8 supported this change, and in the Final EIS the name has been changed.
9

10 **Timing of the Decision:** The timing of the decision was commented on, both for speeding it up
11 and slowing it down.
12

13 **DOE's Response:** The DOE has several legal and policy drivers requiring the preparation of a
14 land-use plan. (Please see comment response under "No-Action Alternative").
15

16 **Cultural/Natural Resources Reviews:** Cultural reviews and natural resources should be taken
17 into account when land use is being planned.
18

19 **DOE's Response:** Both cultural reviews and natural resources have been, and would continue
20 to be taken into account when land-use decisions are made. The purpose of the SPAB is to
21 advise the DOE when land-use implementation is being considered.
22

23 **F2.1.20 Plan** 24

25 Eight letters addressed the comprehensive land-use plan. One of the commenters cited
26 concern that what appears to be "management by committee" is too risky. Another commenter
27 thanked DOE for keeping the process open. One commenter was glad that Hanford was
28 created, or there would not be all the land there is today available to preserve. One commenter
29 expressed that the time frame for land-use planning should be about seven generations out.
30 Another cited the lack of impacts described from industrial development. Two commenters were
31 concerned that the sensitivity of LIGO to noise and vibration from other activities at Hanford was
32 not adequately addressed. (Total Plan = 8). RL269, RL446, RTM015, RTR009, RTS013,
33 RTS020, RTS025, RTS026
34

35 **DOE's Response:** The CLUP is meant to be a living document that brings DOE into
36 cooperative planning with the local governments where possible, but also allows DOE to fulfill its
37 Federal missions. To make the CLUP a viable planning tool, DOE has proposed a SPAB that
38 would provide a forum for local governments to discuss their planning intentions and how
39 Hanford might fit in as a regional complex. The DOE's NEPA process suggests that EISs which
40 establish land-use plans be reviewed by the NEPA Compliance Officer for revisions on a five-
41 year schedule. As an advisory board, the SPAB would be able to tackle such issues as:
42

- 43 • The extreme sensitivity of the LIGO facilities to noise and vibration created by other
44 activities on the Hanford Site even though such activities may be at large distances
45 from LIGO.
46
- 47 • The Energy Northwest lease to continue WNP-2 for power production and also allow
48 for economic reuse of WNP 1 and 4.
49
- 50 • The 200 Areas where contaminated areas are also important wildlife habitat.
51
- 52 • How economic development should be coordinated, and where PILT payments fit into
53 the economic health of the region.
54

1 **F2.1.21 Public Involvement**

2
3 The DOE received 65 letters and testimonies related to the public involvement process
4 for the Revised Draft HRA-EIS. Specifically, these included comments on the "opportunity to
5 comment" (33), comments on the multiple public hearings (15), and comments on the quality of
6 the document and the work that went into preparing the document (24). A summary of the
7 comments received under this category is provided below. (Total Public Involvement = 65).
8 RE012, RE013, RE028, RL003, RL006, RL043, RL052, RL054, RL103, RL153, RL154, RL166,
9 RL178, RL179, RL185, RL200, RL204, RL205, RL206, RL225, RL228, RL230, RL234, RL270,
10 RL273, RL281, RL290, RL291, RL292, RL304, RL314, RL318, RL319, RL322, RL328, RL341,
11 RL342, RL344, RL345, RL349, RL355, RL361, RL381, RL443, RL445, RLM001, RTM012,
12 RTP001, RTP002, RTP004, RTP005, RTP006, RTP008, RTP010, RTR004, RTR006, RTR011,
13 RTR012, RTR013, RTR014, RTS009, RTS011, RTS015

14
15 **"Opportunity to Comment."** Commenters thanked DOE for the opportunity to review and
16 comment on the document. All but one commenter was appreciative of the comment process,
17 including the consideration DOE was giving to the comments received, and for listening to the
18 public on this topic. One commenter was discouraged, citing the perception that the decision
19 had already been made.

20
21 **DOE's Response:** The Federal regulations for NEPA, 40 CFR 1500-1508, require DOE to
22 make an EIS available to the public for review and comment. The DOE has considered all
23 comments received on the Revised Draft HRA-EIS, and has made changes to its Preferred
24 Alternative in the Final HCP EIS based on public comments received.

25
26 **Multiple Public Hearings.** Commenters were appreciative of DOE holding public hearings both
27 in Richland, and outside of the Tri-Cities. One commenter pointed out that a hearing is required
28 by NEPA regulations. Commenters in Portland complimented the DOE for going outside
29 Washington State to listen to Oregon residents' concerns regarding "this profound and very
30 important issue." A Mattawa resident cited his appreciation for the DOE going to the location
31 where the issues are closest to the people. One Richland commenter said it was "refreshing" for
32 the DOE to listen.

33
34 **DOE's Response:** The Federal regulations for NEPA, 40 CFR 1503, require DOE to solicit
35 comments from those persons or organizations who may be interested or affected by the
36 decision.

37
38 **Document Quality/Preparation:** Commenters were complimentary about the quality of the
39 document and the amount of work that went into preparing the document. Citations included:
40 "a lot of progress has been made," "It was a tremendous amount of work. It took years to
41 accomplish," "give the DOE congratulations," "good work," "well researched and
42 comprehensive," "excellent research and enormous staff work," "good job of reaching out to the
43 community," "extensive and excellent qualitative evaluation and comparison," "thoughtful and
44 comprehensive," and "high quality assessment." These comments were directed at DOE and
45 the nine cooperating agencies who prepared the document. Commenters also were pleased
46 that DOE was addressing the land-use issue.

47
48 **DOE's Response:** A first draft of the HRA-EIS was published for public review in August 1996.
49 In response to comments received on that first draft, DOE worked with the cooperating agencies
50 and consulting Tribal governments to establish a framework for the environmental analyses and
51 the proposed CLUP policies and implementing procedures presented in this Final HCP EIS.
52 Substantial agreement was reached among the cooperating agencies and consulting Tribal
53 governments on the development of land-use designations, and on the format for determining
54 the potential environmental impacts associated with the land uses proposed in this EIS.
55

1 **F2.1.22 Salmon**

2
3 Several letters commented that the salmon need protection. Fifty-two letters were
4 received, all supporting protection of salmon and salmon habitat, supporting salmon recovery
5 efforts, and expressing concern for the dwindling salmon population, the health of the salmon
6 and the people who eat them, and restoration of the salmon runs. Some recommended that we
7 do everything in our power to protect and preserve the salmon and other anadromous fish.
8 (Salmon total = 52). RE005, RE015, RE017, RE021, RL003, RL014, RL025, RL044, RL063,
9 RL069, RL118, RL122, RL146, RL151, RL156, RL162, RL182, RL194, RL209, RL212, RL222,
10 RL223, RL246, RL251, RL261, RL266, RL268, RL284, RL299, RL321, RL324, RL338, RL347,
11 RL356, RL363, RL378, RLR001, RTP004, RTP007, RTP008, RTP012, RTR014, RTR018,
12 RTS007, RTS008, RTS009, RTS010, RTS012, RTS017, RTS018, RTS019, RTS021

13
14 **DOE's Response:** The Hanford Site is home to some of the region's most unique natural
15 resources. In two years, the salmon will be the only endangered species on the Hanford Site.
16 (The Bald Eagle and the Peregrine Falcon have increased in population enough to be taken off
17 the Endangered Species List.) Salmon prime habitat is in the Columbia River in the Wahluke
18 Slope and along the Hanford Reach. The concern for the erosion of the White Bluffs into the
19 river is the silting of the gravel beds where the salmon spawn. This was a significant factor
20 behind the decision to disallow farming as a land use on the Wahluke Slope in the DOE's
21 Preferred Alternative in the Final HCP EIS.

22
23 **F2.1.23 Hanford Reach**

24
25 More than 100 letters were received supporting protection of the Hanford Reach. Most
26 letters cited the critical salmon spawning habitat, as well as the eagles and other wildlife that eat
27 the salmon. Some feel that the future of the entire Northwest depends on the cleanliness of the
28 river. Concern was expressed for the erosion of the White Bluffs, and the effects of orchard
29 growth on the spawning habitat. Although all commenters supported protection of the Reach,
30 three opposed Federal control to achieve that end. One commenter stated that DOE is
31 responsible for contaminating the Reach. (Total Hanford Reach = 109). RE002, RE013,
32 RE015, RE018, RE028, RL031, RL032, RL041, RL042, RL043, RL048, RL052, RL059, RL063,
33 RL074, RL084, RL114, RL116, RL117, RL132, RL133, RL142, RL146, RL154, RL160, RL162,
34 RL177, RL179, RL188, RL191, RL209, RL212, RL214, RL219, RL221, RL235, RL237, RL240,
35 RL241, RL244, RL251, RL262, RL265, RL266, RL268, RL272, RL278, RL281, RL284, RL288,
36 RL291, RL296, RL299, RL303, RL324, RL342, RL344, RL363, RL364, RL366, RL369, RL440,
37 RL448, RL449, RL450, RL451, RLR001, RLR004, RLR006, RTM006, RTM009, RTP001,
38 RTP002, RTP005, RTP006, RTP007, RTP008, RTP011, RTP012, RTR002, RTR004, RTR005,
39 RTR006, RTR008, RTR010, RTR011, RTR013, RTR014, RTR015, RTR016, RTR018, RTR020,
40 RTR022, RTR024, RTR026, RTS001, RTS003, RTS004, RTS007, RTS009, RTS010, RTS011,
41 RTS012, RTS013, RTS016, RTS017, RTS018, RTS019, RTS020

42
43 **DOE's Response:** The Hanford Reach is a valuable national resource, abundant in natural
44 beauty and home to a large biologically diverse wildlife. It is because of the intrinsic value of this
45 free-flowing section of the Columbia River and the area surrounding it that DOE has included the
46 Hanford Reach in the area placed under USFWS management as an overlay wildlife refuge.

47
48 **F2.1.24 Tribal Rights**

49
50 Several of the commenters expressed their concern that Tribal rights be honored
51 by DOE. Ten of the twenty-one commenters held firm that all Tribal rights must be supported.
52 Many of the letters also expressed support for the protection of cultural and religious sites from
53 disturbance. One commenter noted that Tribal rights would be protected by local control. One
54 commenter recommended working with the Yakama Indian Nation. One commenter supported
55 modifications to Alternative One to accommodate the needs of the Tribes. One commenter

1 noted that the land need not be given back to farmers since the land was originally stolen from
2 the Wanapum, Yakama, and Nez Perce. One commenter wished DOE had considered an
3 option to deed stewardship back to the Tribes. (Total Tribal Rights = 21). RE023, RL044,
4 RL155, RL159, RL168, RL267, RL291, RL292, RL293, RL354, RL356, RL358, RTP001,
5 RTP002, RTP009, RTP011, RTP013, RTS004, RTS006, RTS011, RTS013
6

7 **DOE's Response:** Tribal governments and DOE agree that the Tribal governments' treaty-
8 reserved right of taking fish at all "usual and accustomed" places applies to the Hanford Reach
9 of the Columbia River where it passes through Hanford, and that treaty rights are inalienable
10 rights exercised by tribal members.
11

12 Nevertheless, Tribal governments and DOE disagree over the applicability to the Hanford Site of
13 Tribal members, treaty-reserved rights to hunt, gather plants, and pasture livestock. Both the
14 Tribal governments and DOE can point to legal justification for their positions in this dispute. As
15 this dispute could take years to resolve, the Tribal governments who worked as consulting
16 agencies and DOE decided not to delay completion and implementation of a comprehensive
17 land-use plan for the Hanford Site while awaiting the resolution of this dispute. Instead, the
18 Tribes and DOE have gone ahead with the land-use planning process while reserving all rights
19 to assert their respective positions regarding treaty rights. Neither the existence of this EIS nor
20 any portion of its contents is intended to have any influence over the resolution of the treaty
21 rights dispute. There are too many instances where DOE and the Tribal governments agree that
22 actions need to be taken to protect Tribal interests where arguing over the legal bases of those
23 interests would be counterproductive to both parties.
24

25 **F2.1.25 Wild and Scenic River**

26
27 Of all the commenters addressing a Wild and Scenic River designation for the Columbia
28 River flowing through the Hanford Reach, 37 were in favor of the designation and 6 were
29 opposed. Some of the commenters noted that the designation must be made without delay, and
30 several noted that the river and riverbanks must be protected at all costs. Those opposed cited
31 that such a designation gives no assurance that the area would be managed to meet existing
32 and future local needs, such as water rights. (Total Wild and Scenic = 43). RL119, RL131,
33 RL133, RL134, RL147, RL168, RL182, RL185, RL204, RL206, RL230, RL235, RL240, RL241,
34 RL248, RL268, RL286, RL287, RL289, RL314, RL320, RL321, RL326, RL352, RL356, RL360,
35 RL366, RL440, RLR001, RLR003, RLR004, RTM015, RTP002, RTP003, RTP004, RTR019,
36 RTS001, RTS007, RTS008, RTS016, RTS017, RTS019, RTS024
37

38 **DOE's Response:** The *Wild and Scenic River Act of 1968*, as amended, protects selected
39 national rivers possessing outstanding scenic, recreational, geological, fish and wildlife,
40 historical, cultural, and other similar values. These rivers are to be preserved in a free flowing
41 condition to protect water quality and for other vital national conservation purposes. The
42 Columbia River, along the Hanford Reach, is a 52-mile-long, free-flowing section which is
43 irreplaceable spawning ground for salmon and other anadromous fish. This area, including the
44 banks of the Columbia River, exhibits a unique diversity of plant and animal life, and DOE is
45 committed to protecting the environment along this stretch of the river. However, the
46 designation of the Hanford Reach portion of the Columbia River as a Wild and Scenic River is
47 not within DOE's authority. Public Law 100-605, passed by Congress on November 4, 1988,
48 authorizes a comprehensive study of the Hanford Reach of the Columbia River to identify the
49 outstanding features of the Hanford Reach and its immediate environment, and to examine
50 alternatives for their preservation. The Secretary of the Interior has affirmed the addition of the
51 Hanford Reach to the National Wild and Scenic Rivers System and is waiting for Congressional
52 action to implement the decision.
53

1 **F2.1.26 Habitat**

2
3 More than 70 commenters addressed wildlife habitat. Sixty-nine of the letters were in
4 favor of setting aside land for conservation and preservation of habitat, noting that the wildlife
5 needs our protection. Many of the commenters noted that the number of native species, plants,
6 animals, and native plant communities at Hanford; and the diversity and scale of the ecosystem
7 is unique in this area. Many of the commenters mentioned the valuable shrub-steppe habitat,
8 which is home to many species, including the sage sparrow, desert butterflies, and species of
9 snakes, other reptiles, and amphibians. It was noted that at least two new plants to science
10 have been discovered on the Hanford Site. Concern for the well-being of wildlife, plants,
11 wildflowers, and fish habitat was expressed. Some emphasized the need for large areas of land
12 for the wildlife, noting that if the land is fragmented, the wildlife cannot survive. Three
13 commenters did not support wildlife habitat, noting that it is only weeds, and that DOE should not
14 support wildlife over children's education. One of the opposing commenters noted that it is
15 possible for wildlife to coexist with farming and development. (Total Habitat = 72). RE006,
16 RE012, RE015, RE017, RE020, RE023, RL007, RL008, RL013, RL029, RL032, RL038, RL056,
17 RL059, RL060, RL061, RL063, RL067, RL070, RL086, RL087, RL103, RL114, RL123, RL139,
18 RL146, RL158, RL161, RL163, RL164, RL165, RL168, RL171, RL175, RL178, RL179, RL222,
19 RL227, RL238, RL256, RL257, RL261, RL267, RL268, RL272, RL276, RL278, RL288, RL291,
20 RL314, RL326, RL338, RL379, RL445, RL452, RLP001, RLR006, RTM002, RTM007, RTM009,
21 RTP001, RTP007, RTP008, RTP009, RTP011, RTP013, RTP014, RTR002, RTR023, RTS014,
22 RTS017, RTS018

23
24 **DOE's Response:** The DOE recognizes the unique shrub-steppe ecosystem on the Hanford
25 Site, and the abundance of plant and animal life that flourish in the natural state of this area. It is
26 because of the need to protect the environment (meeting DOE's policy as a Natural Resource
27 Trustee), that acreage for preservation is considered a high priority. Many of the plants and
28 animals on the Hanford Site need large expanses of land to survive. The DOE's Preferred
29 Alternative in the Final HCP-EIS protects and preserves the environment by placing a large
30 portion of the Hanford Site under management of the USFWS as an overlay wildlife refuge.

31
32 **F2.1.27 Wahluke Slope**

33
34 The Wahluke Slope was the topic for many commenters. A total of 63 commenters cited
35 concerns regarding the Wahluke Slope. More than half (59 percent) were against any farming
36 on the Wahluke Slope. Ten supported farming for the area, particularly its suitability for irrigated
37 production. Seventeen commenters supported an impartial study of all of the potential uses of
38 the Wahluke Slope. (Total Wahluke Slope = 63). RE012, RE029, RL117, RL121, RL131,
39 RL160, RL161, RL163, RL179, RL204, RL221, RL222, RL250, RL268, RL283, RL288, RL297,
40 RL298, RL301, RL305, RL308, RL324, RL329, RL332, RL333, RL335, RL336, RL337, RL347,
41 RL350, RL351, RL352, RL363, RL441, RL447, RL450, RLM001, RTM005, RTM010, RTM011,
42 RTM012, RTM013, RTM014, RTM015, RTM020, RTP005, RTP006, RTP007, RTP008,
43 RTR002, RTR006, RTR009, RTR013, RTR014, RTS001, RTS002, RTS003, RTS007, RTS010,
44 RTS011, RTS012, RTS017, RTS021

45
46 **DOE's Response:** The DOE's Preferred Alternative in the Final HCP EIS would preclude
47 agricultural activities on the Hanford Site. The DOE has placed the entire Wahluke Slope under
48 the management of the USFWS as an overlay wildlife refuge, as the WDFW, the USFWS, and
49 the U.S. EPA support the designation of the entire Wahluke Slope for Preservation. The
50 WDFW, the USFWS, and DOE have recognized that the White Bluffs overlooking the Columbia
51 River are fragile and have been sloughing off into the Columbia River, in part due to irrigation
52 runoff. Also, the Wahluke Slope is the last remaining large and healthy shrub steppe ecosystem
53 in the Pacific Northwest, and the Hanford Reach is the last free-flowing section of the Columbia
54 River. In recognition of the fragility of the White Bluffs and the important ecological and cultural
55 resources of the Wahluke Slope and the Hanford Reach, DOE has, in its Preferred Alternative in

1 the Final HCP EIS, designated the entire Wahluke Slope for Preservation as an overlay wildlife
2 refuge.

3
4 The DOE believes that further studies of the potential uses of the Wahluke Slope are not
5 warranted. The DOE believes that adequate studies have already been conducted to assess the
6 potential impacts of alternative uses of the Wahluke Slope. Potential environmental, cultural,
7 and socioeconomic impacts of alternative uses of the Wahluke Slope were assessed. Further
8 studies would essentially duplicate analyses already conducted for the Draft and Revised Draft
9 HRA-EIS and studies conducted by the National Park Service in support of the 1994 Hanford
10 Reach Environmental Impact Statement for the Comprehensive River Conservation Study
11 (referred to as the Hanford Reach EIS) and the ensuing 1996 DOI ROD. The Hanford Reach
12 EIS and ROD were Congressionally mandated to assess the outstanding features of the Hanford
13 Reach and its environs, including environmental and cultural values, and to examine alternatives
14 for preserving those values. The ROD concluded that, in order to protect the White Bluffs and
15 the cultural and ecological resources of the Wahluke Slope, the entire Wahluke Slope should be
16 managed as a wildlife refuge by the USFWS.

17
18 The DOE concurred in the 1994 DOI Hanford Reach EIS. Management of the Wahluke Slope
19 for Preservation as an overlay wildlife refuge under the Preferred Alternative is consistent with
20 that concurrence. The 1996 ROD for the Hanford Reach EIS precludes DOE from managing the
21 Wahluke Slope in a manner that would any adverse impacts on the values for which the
22 Wahluke Slope is under consideration for National Wildlife Refuge status.

23 24 **F2.1.28 Split Record of Decision**

25
26 Many commenters supported a split ROD to expedite the designation of a wildlife refuge
27 (i.e., without waiting for the cleanup to be completed). One hundred and eighty-six commenters
28 wrote concerning this issue. A few commented that they wanted the separate decision no later
29 than December 1999. (Total Split ROD = 186). RE002, RE003, RE009, RE010, RE019,
30 RE021, RE026, RL005, RL006, RL007, RL008, RL009, RL010, RL013, RL014, RL015, RL016,
31 RL017, RL018, RL019, RL022, RL023, RL027, RL033, RL034, RL035, RL037, RL041, RL042,
32 RL048, RL049, RL051, RL052, RL053, RL055, RL057, RL064, RL065, RL066, RL068, RL069,
33 RL074, RL076, RL078, RL079, RL080, RL081, RL082, RL083, RL084, RL085, RL087, RL089,
34 RL092, RL093, RL095, RL096, RL099, RL100, RL101, RL102, RL103, RL104, RL105, RL107,
35 RL109, RL112, RL115, RL125, RL127, RL128, RL129, RL130, RL132, RL133, RL134, RL135,
36 RL136, RL138, RL139, RL140, RL148, RL149, RL150, RL151, RL154, RL158, RL160, RL165,
37 RL167, RL172, RL174, RL177, RL179, RL184, RL185, RL187, RL189, RL191, RL192, RL193,
38 RL194, RL203, RL204, RL206, RL207, RL211, RL213, RL215, RL216, RL220, RL222, RL223,
39 RL224, RL225, RL228, RL230, RL231, RL236, RL239, RL242, RL243, RL245, RL246, RL247,
40 RL249, RL252, RL253, RL254, RL255, RL256, RL257, RL261, RL262, RL266, RL267, RL268,
41 RL271, RL273, RL274, RL275, RL276, RL277, RL280, RL281, RL282, RL294, RL309, RL312,
42 RL314, RL315, RL316, RL320, RL323, RL340, RL342, RL360, RL363, RL365, RL368, RL369,
43 RL371, RL376, RL377, RL378, RL379, RL380, RL382, RL448, RL450, RLR005, RLR006,
44 RLS002, RLS005, RTP004, RTP006, RTP008, RTP012, RTR005, RTR006, RTR008, RTR012,
45 RTS014, RTS018, RTS019, RTS020.

46
47 **DOE Response:** While the scope of the Final HCP-EIS covers land-use planning for the entire
48 Hanford Site, it defers the evaluation of impacts associated with individual remedial actions to
49 Tri-Party Agreement documents. The ROD for this Final HCP-EIS is scheduled to be published
50 in November 1999; therefore, no "separate" ROD needs to be published in order to expedite the
51 implementation of the Hanford Comprehensive Land-Use Plan.

Glossary

1
2
3
4 **100-year flood.** A flood event of a magnitude that occurs, on average, once every 100 years,
5 and equates to a 1-percent probability of occurring in any given year.
6

7 **Adequate public facilities.** Facilities which have the capacity to serve development without
8 decreasing levels of service below locally established minimums.
9

10 **Affected environment.** In an environmental impact statement, a description of the existing
11 environment covering information that directly relates to the scope of the proposed action and
12 alternatives that are analyzed in the impact analysis. The affected environment provides a
13 baseline and must include sufficient detail to support the impact analysis, including cumulative
14 impacts. Environmentally sensitive resources, such as floodplains and wetlands, threatened and
15 endangered species, prime and unique agricultural lands, and historic and cultural resources,
16 must be identified.
17

18 **Agriculture.** Improvements or activities associated with the growing, cultivating, and/or
19 harvesting of crops and livestock, including those activities necessary to prepare the agricultural
20 commodity for shipment.
21

22 **Agricultural land-use designation.** As presented in this environmental impact statement, an
23 area designated for the tilling of soil, raising of crops and livestock, and horticulture for
24 commercial purposes along with all those activities normally and routinely involved in
25 horticulture, and the production of crops and livestock. Includes related activities consistent with
26 Agricultural uses.
27

28 **Atmospheric stability.** A measure of the amount of mixing and turbulence in the atmosphere.
29

30 **Attainment area.** Any area that is designated, pursuant to 42 U.S.C. 7407(d) of the *Clean Air*
31 *Act of 1970*, as having ambient conditions equal to or less than national primary or secondary
32 ambient air quality standards for a particular air pollutant or a group of air pollutants.
33

34 **Animal-unit-month (AUM).** An AUM is defined as the amount of forage required by an animal-
35 unit (i.e., a mature cow weighing 453.6 kg [1,000 lbs] with unweaned calf) for one month
36 assuming average daily consumption to be 11.8 kg (26 lbs) of dry matter. Therefore, by
37 convention, an AUM equals 353.8kg (780 lbs) of dry forage. The amount of area that is required
38 for each AUM determines the stocking rate or the actual number of animals on a specific area at
39 a specific time. The area of land allowed per animal unit for the entire grazing period of the year
40 is expressed as animal units/unit area (AU/Ha) or unit area/AUM (Ha/AUM).
41

42 **Background radiation.** Radiation from cosmic sources; naturally occurring radioactive
43 materials, including radon (except as a decay product of source or special nuclear material);
44 consumer products containing nominal amounts of radioactive material or producing nominal
45 amounts of radiation; and global fallout that exists in the environment (e.g., from the testing of
46 nuclear explosive devices).
47

48 **Barrier.** Man-made components of a waste management system designed to prevent or
49 impede the release of radionuclides or other contaminants to the biosphere. Barriers can
50 include the waste form, waste container, and materials placed over, under, or around these
51 containers or wastes. For example, an engineered cap constructed over a waste site is a
52 barrier.
53

1 **Basalt.** A dark grey to black, fine grained igneous rock composed primarily of calcium feldspar
2 and pyroxene, with or without olivine. This material underlies the Hanford Site, and may be
3 quarried for use as riprap in the construction of caps to prevent the migration of contaminants in
4 surface soils and burial grounds by preventing infiltration of precipitation.

5
6 **Benthic.** Living on or at the bottom of a body of water.

7
8 **Biodiversity.** The diversity of ecosystems, species, and genes, and the variety and variability of
9 life. Biodiversity also is a qualitative measure of the richness and abundance of ecosystems and
10 species in a given area.

11
12 **Bounding.** Represents the maximum reasonably foreseeable event or impact. All other
13 reasonably foreseeable events or impacts would have fewer and/or less severe environmental
14 impacts.

15
16 **Candidate species.** A plant or animal species that is under consideration by the U.S. Fish and
17 Wildlife Service or Washington Department of Fish and Wildlife for listing as either threatened or
18 endangered.

19
20 **Cap.** Construction of an engineered barrier over the top of a waste site in order to prevent or
21 impede the release of radionuclides or other waste material into the environment.

22
23 **Carcinogen.** Any substance or agent that is capable of producing cancer.

24
25 **Chronic exposure.** The absorption or intake of hazardous material over a long period of time
26 (e.g., over a lifetime).

27
28 **Class I area.** Under the *Clean Air Act of 1970*, the designation applies to pristine areas, such as
29 national parks and wilderness areas, where substantial growth is effectively precluded in order to
30 avoid degradation of air quality. Goat Rocks Wilderness Area is the closest Class I area to the
31 Hanford Site, located approximately 90 miles northwest.

32
33 **Class II area.** A designation for areas under the *Clean Air Act of 1970* where moderate
34 degradation of air quality is permissible. The Hanford Site and its immediate vicinity are in a
35 Class II Area.

36
37 **Cold War.** Intense economic, political, military, and ideological rivalry between nations just short
38 of military conflict. Major expansions in the production of nuclear materials for military
39 applications were undertaken at the Hanford Site so that the Nation could maintain an
40 overwhelming arsenal of nuclear weapons. In the context of this environmental impact
41 statement, the Cold War refers to the period from the end of World War II to 1989 (when the
42 Berlin Wall was dismantled).

43
44 **Confined aquifer.** An aquifer bounded above and below by less permeable layers.
45 Groundwater in the confined aquifer is under a pressure greater than atmospheric pressure.

46
47 **Conservation.** Areas of ecological, geological, archaeological, and cultural significance and
48 sensitivity that are to be protected and managed so as to maintain the essential qualities derived
49 from the landscape, but contain supplemental values of scientific, education, historical, scenic,
50 and mineral importance that may be suited to human uses insofar as the essential qualities
51 remain intact over the landscape.

52
53 **Conservation (Mining) land-use designation.** As presented in this environmental impact
54 statement, an area reserved for the management and protection of archeological, cultural,
55 ecological, and natural resources. Limited and managed mining could occur as a special use

1 (e.g., a permit would be required) within appropriate areas. Limited public access would be
2 consistent with resource conservation. Includes activities related to Conservation (Mining),
3 consistent with the protection of archeological, cultural, ecological, and natural resources.
4

5 **Conservation (Mining and Grazing) land-use designation.** An area reserved for the
6 management and protection of archeological, cultural, ecological, and natural resources.
7 Limited and managed mining and commercial grazing could occur as a special use (e.g., a
8 permit would be required) within appropriate areas. Limited public access would be consistent
9 with resource conservation. Includes activities related to Conservation (Mining and Grazing),
10 consistent with the protection of archeological, cultural, ecological and natural resources.
11

12 **Controlled area.** An area to which access is controlled to protect individuals from exposure to
13 radiation or radioactive and/or hazardous materials.
14

15 **Contamination.** The presence of unwanted radioactive and/or hazardous materials above
16 background concentrations in environmental media (e.g., air, soil, water) or on the surfaces of
17 structures, objects, or personnel.
18

19 **Criteria pollutants.** Substances for which national ambient air quality standards have been
20 established by the U.S. Environmental Protection Agency.
21

22 **Critical areas.** Critical areas are required by Chapter 36.70A of the *State of Washington's*
23 *Growth Management Act*. Guidelines for defining critical areas are given in WAC 365-190-080.
24 Items to be considered by the local planning agency are as follows: (1) wetlands, (2) aquifer
25 recharge areas, (3) frequently flooded areas, (4) geologically hazardous areas, and (5) fish and
26 wildlife habitat conservation areas. Counties and cities may use information prepared by the
27 Washington Department of Fish and Wildlife (WDFW) to classify and designate locally important
28 habitats and species. Priority habitats and priority species are being identified by the WDFW for
29 all lands in Washington State. While these priorities are those of the Department, they and the
30 data on which they are based may be considered by counties and cities.
31

32 **Critical habitat.** Any air, land, or water area determined (through a regulatory action under the
33 *Endangered Species Act of 1973*) to be essential to the survival of a population of an
34 endangered or threatened species or habitat deemed to be necessary for the recovery of a
35 threatened or endangered species. Critical habitat has not been designated on the Hanford
36 Site.
37

38 **Cumulative impact.** The impact on the environment that results from the incremental impact of
39 the action when added to other past, present, and reasonably foreseeable, future actions.
40 Cumulative impacts can result from individually minor, but collectively significant actions taking
41 place over a period of time.
42

43 **Cultural resources.** Areas or objects that are of cultural significance to human history at the
44 national, state, or local level. Generally includes paleontological, pre-contact, and post-contact
45 resources, as well as resources of traditional use or religious value to Native Americans.
46

47 **Decommissioning.** The process of removing a facility from operation, followed by
48 decontamination, entombment, dismantlement, or conversion to another use.
49

50 **Decontamination.** The actions taken to reduce or remove substances that pose a substantial
51 present or potential hazard to human health or the environment, (e.g., removing radioactive
52 contamination from facilities, soil, or equipment by washing, chemical action, mechanical
53 cleaning, or other techniques).
54

2 to, the construction, reconstruction, conversion, structural alteration, relocation, or enlargement
3 of any improvements.

4
5 **DOE orders.** Requirements internal to the U.S. Department of Energy that establish agency
6 policy and procedures, including procedures for compliance with applicable laws.

7
8 **Derived concentration guides.** Concentrations of radionuclides in air and water that an
9 individual could continuously consume, inhale, or be immersed in at average annual rates
10 without receiving an effective dose equivalent greater than 100 mrem/yr.

11
12 **Dose (or radiation dose).** A generic term that means absorbed dose, dose equivalent,
13 effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or
14 total effective dose equivalent. Relates to a chemical to which an organism is exposed;
15 generally denotes the quality of radiation or energy that is absorbed by the organism.

16
17 **Dose conversion factor.** Any factor used to change an environmental measurement to dose in
18 units of concern.

19
20 **Ecosystem.** The interacting system of a biological community and its physical environment,
21 considered as a unit in nature.

22
23 **Emission standards.** Legally enforceable limits on the quantities and/or kinds of air pollutants
24 that can be emitted into the atmosphere.

25
26 **Endangered species.** Animals, birds, fish, plants, or other living organisms threatened with
27 extinction by man-made or natural changes in their environment. Requirements for declaring a
28 species endangered are contained in the *Endangered Species Act of 1973*.

29
30 **Emergency planning zone (EPZ).** The EPZ is an area surrounding a facility for which
31 emergency planning and preparedness efforts are carried out to ensure that prompt and
32 effective actions can be taken to minimize the impact to onsite personnel, public health and
33 safety, and the environment in the event of an operational emergency. The EPZ begins at the
34 boundary of the facility and ends at a distance for which special planning and preparedness
35 efforts are no longer required. Access restrictions are not required within an EPZ; however,
36 DOE would be responsible for ensuring adequate planning and preparedness efforts. A plan
37 that evaluates *hazard assessments and determines the size of EPZs* is a requirement of DOE
38 Order 151.1, *Comprehensive Emergency Management System Order*.

39
40 **Environmental justice.** The fair treatment of people of all races, cultures, and income with
41 respect to the development, implementation, and enforcement of environmental laws,
42 regulations, and policies. Executive Order 12898 required Federal agencies to identify and
43 address any potentially disproportionately high and adverse human health and environmental
44 effects of agency policies, programs, and activities on minority and low-income populations.

45
46 **Evapotranspiration.** The combined processes by which water is transferred from the surface
47 of the Earth to the atmosphere, including evaporation of liquid or solid water, and transpiration
48 from plants.

49
50 **Exclusive use zone (EUZ).** The EUZ is an area designated for DOE operations activities
51 associated with a waste site or facility. Each DOE nuclear facility is encouraged by DOE Order
52 420.1, *Facility Safety*, to maintain siting distance for a public buffer zone as part of the defense
53 in depth approach to prevent public health effects in the event of an unmitigated accident. The
54 EUZ is reserved for DOE or other hazardous operations with severely restricted public access.
55 This zone extends from the facility fence line to a distance at which threats to the public from

1 routine and accidental releases diminish to the point where public access can be routinely
2 allowed. It is inside the emergency planning zone (EPZ).
3

4 **Exposure scenario.** A set of facts, assumptions, and inferences about how exposure takes
5 place that aids the exposure assessor in evaluating, estimating, or quantifying exposures.
6

7 **Facility area.** An area within the Hanford Site Boundary immediately surrounding a facility or
8 group of facilities that functions under process safety management and a common emergency
9 response plan.
10

11 **Floodplain.** The portion of a river valley that becomes covered with water when the river
12 overflows its banks at flood stage.
13

14 **Food chain.** The pathways by which any material entering the environment passes from the
15 first absorbing organism through plants and animals, including humans.
16

17 **Fugitive dust.** The particulate matter that is stirred up and released into the atmosphere during
18 excavation or construction activities.
19

20 **Grazing.** To feed on growing herbage, attached algae, or phytoplankton
21

22 **Groundwater.** The supply of water below the land surface in the zone of saturation.
23

24 **Groundwater mounds.** A hydrologic condition, often caused by artificial recharge of an aquifer,
25 in which "mounds" of groundwater are created. These mounds have been known to alter the
26 natural hydraulic gradients and drainage patterns of an aquifer. The pressure and weight of the
27 groundwater mounds can increase the hydrostatic head so all nearby groundwater, and any
28 associated contaminant plume, could move more rapidly toward a receptor.
29

30 **Grouting.** The process of immobilizing or fixing solid or liquid forms of waste to enable safe
31 storage or disposal. Generally, grout is a fluid mixture of cementitious materials and waste that
32 sets up as a solid mass.
33

34 **Half-life.** The time in which half the atoms of a particular radioactive substance disintegrate to a
35 different nuclear form. Used as a measure of the persistence of radioactive materials; each
36 radionuclide has a characteristic, constant half-life. Measured half-lives vary from millionths of a
37 second to billions of years.
38

39 ***Hanford Federal Facility Agreement and Consent Order.*** The *Hanford Federal Facility*
40 *Agreement and Consent Order* (also referred to as the Tri-Party Agreement), is a binding
41 agreement, negotiated pursuant to Section 120 of the *Comprehensive Environmental Response,*
42 *Compensation, and Liability Act of 1980*, and other regulations signed by the U.S. Department of
43 Energy, the U.S. Environmental Protection Agency (Region 10), and the Washington State
44 Department of Ecology, to organize responsibilities for remediation of the Hanford Site and to
45 establish milestones by which the remediation will be accomplished. This agreement commits
46 the three agencies to a long-term cooperative program to remediate the contaminated sites at
47 Hanford. The Tri-Party Agreement contains a blueprint for remediation and uses enforceable
48 milestones to keep the program on schedule.
49

50 **Hazard classification.** A safety classification based on potential onsite consequences. Criteria
51 for this classification are discussed in DOE Order 5480.23, *Nuclear Safety Analysis Reports*.
52

53 **Hazardous air pollutant.** Any air pollutant subject to a standard promulgated under 42 U.S.C.
54 Section 7412 or other requirements established under 42 U.S.C. Section 7412 of the *Clean Air*
55 *Act of 1970*, including 42 U.S.C. Section 7412 (g), (j), and (r) to the *Clean Air Act of 1970*. The

1 State of Washington regulates similar pollutants as "toxic air pollutants." However, State
2 regulations apply only to new sources; Federal regulations apply to new and existing sources.
3 The list of chemicals regulated by the state overlaps with the Federal list, but is considerably
4 longer.
5

6 **Hazardous material.** A substance or material, including a hazardous substance, that has been
7 determined by the U.S. Secretary of Transportation to be capable of posing an unreasonable
8 risk to health, safety, and property when transported in commerce.
9

10 **Hazardous substance.** Any substance that, when released to the environment in an
11 uncontrolled or unpermitted fashion, becomes subject to the reporting and possible response
12 provisions of the *Clean Water Act of 1977* and the *Comprehensive Environmental Response,*
13 *Compensation, and Liability Act of 1980.*
14

15 **Hazardous waste.** Those wastes that are identified as hazardous pursuant to RCRA
16 (40 CFR 261).
17

18 **High-efficiency particulate air (HEPA) filter.** A filter with an efficiency of at least 99.95% that
19 is used to separate particles from exhaust streams prior to release into the atmosphere.
20

21 **Highest and best use (of property).** Section 101-47.4909 of the Federal Property
22 Management Regulations defines the "highest and best use" as that use to which a property can
23 be put that produces the highest monetary return from the property, promotes its maximum
24 value, or serves a public or institutional purpose. The "highest and best use" determination must
25 be based upon the property's economic potential, qualitative values inherent in the property, and
26 utilization factors affecting land use such as zoning, physical characteristics, other private and
27 public uses in the vicinity, neighboring improvements, utility services, access, roads, location,
28 and environmental and historical considerations.
29

30 **High-Intensity Recreation land-use designation.** As presented in this environmental impact
31 statement, an area allocated for high-intensity, visitor-serving activities and facilities (commercial
32 and governmental) such as golf courses, recreational vehicle parks, boat launching facilities,
33 Tribal fishing facilities, destination resorts, cultural centers, and museums. Includes related
34 activities consistent with High-Intensity Recreation.
35

36 **High-level waste.** The highly radioactive waste material that results from processing or
37 reprocessing spent nuclear fuel, including liquid waste produced directly from reprocessing and
38 any solid waste derived from the liquid that contains a combination of transuranic and fission
39 product nuclides in quantities that require permanent isolation. High-level waste may include
40 other highly radioactive material that the U.S. Nuclear Regulatory Commission, consistent with
41 existing law, determines by rule to require permanent isolation.
42

43 **Historic resources.** The sites, districts, structures, and objects that are considered limited and
44 nonrenewable because of an association with historic events, persons, or social or historic
45 movements.
46

47 **Horticulture.** The science and art of growing fruits, vegetables, flowers, or ornamental plants.
48

49 **Hydraulic conductivity.** The capacity of a porous medium to transport water. The parameter
50 relating the volumetric flux to the driving force in flow through a porous medium (particularly
51 water through soil); a function of both the porous medium and the properties of the fluid.
52

53 **Hydraulic gradient.** The slope of the water table.

1
2 **Impact.** The effect, influence, alteration, or imprint of an action. Impacts may be beneficial or
3 detrimental.
4

5 **Industrial land-use designation.** As presented in this environmental impact statement, an
6 area suitable and desirable for activities, such as reactor operations, rail, barge transport
7 facilities, mining, manufacturing, food processing, assembly, warehouse, and distribution
8 operations. Includes related activities consistent with Industrial uses.
9

10 **Industrial-Exclusive land-use designation.** As presented in this environmental impact
11 statement, an area suitable and desirable for treatment, storage, and disposal of hazardous,
12 dangerous, radioactive, and nonradioactive wastes. Includes related activities consistent with
13 Industrial-Exclusive uses.
14

15 **Infrastructure.** The basic services, facilities, and equipment needed for the operation and
16 growth of an area.
17

18 **Institutional controls.** The term "institutional controls" is intended to be a broad term. It
19 generally includes all non-engineered restrictions on activities, access, or exposure to land,
20 groundwater, surface water, waste and waste disposal areas, and other areas or media. Some
21 common examples of tools to implement institutional controls include restrictions on use or
22 access, zoning, governmental permitting, public advisories, installation master plans, and legal
23 restrictions such as deed notices or other environmental easements. Institutional controls may
24 be temporary or permanent restrictions or requirements.
25

26 **Interim action (NEPA).** An action that may be undertaken while work on a required program
27 environmental impact statement is in progress, and the action is not covered by an existing
28 program statement. An interim action may not be undertaken unless such action: (1) is justified
29 independently of the program; (2) is itself accompanied by an adequate environmental impact
30 statement or has undergone other *National Environmental Policy Act of 1969* review; and (3) will
31 not prejudice the ultimate decision on the program (i.e., interim action prejudices the ultimate
32 decision on the program when the action tends to determine subsequent development or limits
33 alternatives).
34

35 **Ion exchange.** The reversible interchange of ions of like charge within a medium.
36

37 **Land use.** A term used to indicate the utilization of any piece of land. The way in which land is
38 being used is the land use.
39

40 **Land-use planning.** A decision-making process to determine the future or end use of a parcel
41 of land, considering such factors as current land use, public expectations, cultural
42 considerations, local ecological factors, legal rights and obligations, technical capabilities, and
43 cost.
44

45 **Life-cycle costs.** All costs, except the cost of personnel occupying a facility, from the time that
46 the space requirement is defined until the facility passes out of government hands.
47

48 **Low-Intensity Recreation land-use designation.** As presented in this environmental impact
49 statement, an area allocated for low-intensity, visitor-serving activities and facilities, such as
50 improved recreational trails, primitive boat launching facilities, and permitted campgrounds.
51 Includes related activities consistent with Low-Intensity Recreation.
52

53 **Low-level waste.** Radioactive waste that is not classified as high-level waste, transuranic
54 waste, or spent nuclear fuel. Test specimens of fissionable material irradiated for research and
55 development, and not for the production of power or plutonium, may be classified as low-level

1 waste if the concentration of transuranic elements is less than 100 nanocuries per gram of
2 waste. The U.S. Department of Energy, U.S. Environmental Protection Agency, and U.S.
3 Nuclear Regulatory Commission share the responsibility for managing low-level waste.
4

5 **Manhattan Project.** The code name for the large-scale national project that developed the first
6 atomic bomb.
7

8 **Maximally exposed individual (MEI).** An hypothetical person who lives near the Hanford Site
9 who, by virtue of location and living habits, could receive the highest possible radiation dose.
10

11 **Maximum contaminant level (MCL).** Under the *Safe Drinking Water Act of 1974*, the
12 maximum permissible concentrations of specific constituents in drinking water that is delivered to
13 any user of a public water system that serves 15 or more connections and 25 or more people.
14 The standards take into account the feasibility and cost of attaining the standard. In this
15 environmental impact statement, MCLs are referred to as *Drinking Water Standards*.
16

17 **Milestone.** An important or critical event that must occur in order to achieve the objectives of
18 the Tri-Party Agreement.
19

20 **millirem (mrem).** One thousandth (10^{-3}) of a rem (see also, rem).
21

22 **Mitigation.** Those actions that avoid impacts altogether, minimize impacts, rectify impacts,
23 reduce or eliminate impacts, or compensate for impacts.
24

25 **Mitigation bank.** Wetland enhancement, restoration, or creation undertaken to provide
26 mitigation (compensation) for wetlands losses from future development activities undertaken in
27 advance of development as part of a credit program.
28

29 **Mixed waste.** Waste containing both radioactive and hazardous components as defined by the
30 *Atomic Energy Act of 1954* and the *Resource Conservation and Recovery Act of 1976*,
31 respectively.
32

33 **Modified Mercalli intensity (MMI).** The MMI scale (designated by Roman numerals I through
34 XII) is used to measure the intensity of an earthquake in a particular area. It differs from the
35 Richter Scale (which measures the energy released by an earthquake). Briefly, the scale is:
36 I – Barely Felt; II – Just Felt; III – Noticeable; IV – Rattling; V – Felt Strong; VI – Frightening;
37 VII – Disturbing; VIII – Panicking; IX – Some Damage; X – Much Damage; and XI – Complete
38 Destruction.
39

40 **Multiple use management.** Management of the various surface and subsurface resources so
41 that they are utilized in the combination of ways that will best meet the present and future needs
42 of the public, without permanent impairment of the productivity of the land or the quality of the
43 environment.
44

45 **National Ambient Air Quality Standards (NAAQS).** Air quality standards established by the
46 *Clean Air Act of 1970*. Primary NAAQS are intended to protect public health with an adequate
47 margin of safety. Secondary NAAQS are intended to protect the public welfare from any known
48 or anticipated adverse effects of a pollutant.
49

50 **National Environmental Research Parks.** Outdoor laboratories set aside for ecological
51 research to study the environmental impacts of energy developments and for informing the
52 public of environmental and land use options. The parks were established under the
53 U.S. Department of Energy to provide protected land areas for research and education in the
54 environmental sciences and to demonstrate the environmental compatibility of energy
55 technology development and use.

1 **National Priorities List (NPL).** A formal listing of the most hazardous waste sites in the nation,
2 as established under the *Comprehensive Environmental Response, Compensation, and Liability*
3 *Act of 1980*, that have been identified for remediation.
4

5 **National Register of Historic Places.** A list of architectural, historical, archaeological, and
6 cultural sites of local, state, or national significance, established by the *Historic Preservation Act*
7 *of 1966*, and maintained by the National Park Service. Sites are nominated to the Register by
8 state or Federal agencies.
9

10 **Nearest public access location.** For facility accident analysis, the location of the nearest point
11 where members of the public could be present, such as on an uncontrolled public highway that
12 crosses the Hanford Site.
13

14 **Nitrogen oxides (NO_x).** Gases formed from atmospheric nitrogen and oxygen when
15 combustion takes place under high temperature and high pressure. Nitrogen oxides include
16 nitric oxide (NO) and nitrogen dioxide (NO₂). Nitrogen oxides are considered to be a major air
17 pollutant and are regulated under the *Clean Air Act*. In the presence of sunlight, nitric oxide
18 combines with atmospheric oxygen to form nitrogen dioxide, which can cause lung damage at
19 high concentrations.
20

21 **Nonattainment area.** An area which is shown by monitoring data to exceed any national
22 primary or secondary ambient air quality standard for a pollutant.
23

24 **NO_x.** A generic term used to describe oxides of nitrogen (see nitrogen oxides).
25

26 **Nuclear fuel.** Materials that are fissionable and can be used in nuclear reactors for the
27 production of energy.
28

29 **Nuclide.** A generic term referring to all known isotopes, both stable and unstable, of the
30 chemical elements.
31

32 **Offsite.** Any place located outside of the Hanford Site boundary.
33

34 **Onsite.** A place located within the Hanford Site boundary.
35

36 **Operable unit.** A discrete set of one or more release sites that are considered together for
37 assessment and remedial activities. Criteria for placement of release sites into an operable unit
38 include geographic proximity, similarity of waste characteristics and site types, and the
39 possibilities for economy of scale.
40

41 **Outfall.** The end of a drain or pipe that carries waste water or other effluents into a ditch, pond,
42 or river.
43

44 **Overlay wildlife refuge.** An overlay wildlife refuge is one which is owned by one or more
45 Federal agencies and managed by the USFWS. |
46

47 **Permeability.** The degree of ease with which water can pass through a rock or soil.
48

49 **Physiographic province.** An extensive portion of the landscape, normally encompassing many
50 hundred square miles, which portrays similar qualities of soil, rock, shape, and vegetation of the
51 same geomorphic origin.
52

53 **Planning criteria.** The factors used to guide development of the land use plan, or revision, to
54 ensure that it is tailored to the issues previously identified and to ensure that unnecessary data
55 collection and analyses are avoided.

1 **Plume.** The cloud of a pollutant in air, surface water, or groundwater formed after the pollutant
2 is released from a source.

3
4 **Plutonium-Uranium Extraction (PUREX) Facility.** The PUREX Facility on the Hanford Site
5 used a chemical process to reprocess spent nuclear fuel and irradiated targets.

6
7 **PM₁₀.** All particulate matter in the ambient air with an aerodynamic diameter less than or equal
8 to ten (10) micrometers.

9
10 **Polychlorinated biphenyls (PCBs).** A class of chemical substances formerly manufactured for
11 use as an insulating fluid in electrical equipment. These chemical substances are highly toxic to
12 aquatic life, persist in the environment, and accumulate in animal tissues.

13
14 **Porosity.** The ratio of the volume of pores of a material to the volume of its mass.

15
16 **Post-contact resources.** Sites, districts, structures, and objects considered limited and
17 nonrenewable because of their association with renowned events, persons, or social
18 movements.

19
20 **Pre-contact resources.** All evidences of human activity that predate recorded history and can
21 be used to reconstruct lifeways and culture history of past peoples. These include sites,
22 artifacts, and the contexts in which they occur.

23
24 **Pre-contact.** Of, relating to, or existing in times antedating written history. Pre-contact cultural
25 resources are those that antedate written records of the human cultures that produced them.

26
27 **Prehistoric resources.** All evidence of human activity that predates recorded history and can
28 be used to reconstruct lifestyles and cultural history of past peoples, including artifacts and the
29 contexts in which the artifacts occur.

30
31 **Preservation land-use designation.** As presented in this environmental impact statement, an
32 area managed for the preservation of archeological, cultural, ecological, and natural resources.
33 No new consumptive uses (e.g., mining or extraction of non-renewable resources) would be
34 allowed within this area. Limited public access would be consistent with resource preservation.
35 Includes activities related to Preservation uses.

36
37 **Probable maximum flood.** The largest flood for which there is any reasonable expectancy in a
38 specific area. The probable maximum flood is normally several times larger than the largest
39 flood of record.

40
41 **Process knowledge.** The set of information used by trained and qualified individuals who are
42 cognizant of the origin, use, and location of waste-generating materials and processes in
43 sufficient detail to certify the identity of the waste.

44
45 **Processing (of irradiated nuclear fuel).** Applying a chemical or physical process designed to
46 alter the characteristics of the nuclear fuel matrix or to recover a particular material.

47
48 **Production reactor.** A nuclear reactor that is used to irradiate target material to produce
49 special nuclear material or by-product material.

50
51 **rad.** The unit of absorbed dose of ionizing radiation. One rad is equal to an absorbed dose of
52 100 ergs/gram.

53
54 **Radiation (ionizing radiation).** Alpha particles, beta particles, gamma rays, x-rays, neutrons,
55 high-speed electrons, high-speed protons, and other particles capable of producing ions. In the

1 context of this EIS, radiation does not include non-ionizing radiation such as radiowaves,
2 microwaves, or visible, infrared, or ultraviolet light.
3

4 **Radioisotope.** An unstable isotope of an element that decays or disintegrates spontaneously,
5 emitting radiation in the process. Approximately 5,000 natural and artificial radioisotopes have
6 been identified. Usually synonymous with *radionuclide*.
7

8 **Raptor.** A bird of prey (e.g., hawk, eagle, etc.).
9

10 **Red Zone.** The Bureau of Reclamation's (BoR's) Red Zone is an administrative area on the
11 Wahluke Slope set aside by the BoR from irrigated agricultural development while the BoR
12 studies the connection between irrigation in this area and mass wasting events at the White
13 Bluffs.
14

15 **Recharge.** Replenishment of water to an aquifer.
16

17 **Record of Decision (ROD).** A public document that records the final decision(s) concerning a
18 proposed action. The ROD is based in whole or in part on information and technical analysis
19 generated during either the *Comprehensive Environmental Response, Compensation, and*
20 *Liability Act of 1980* process, or the *National Environmental Policy Act of 1969* process, both of
21 which consider public comments and community concerns during the decision-making process.
22

23 **Redd.** The spawning ground or nest of various fish species; the term usually refers to salmon
24 nests.
25

26 **Region of influence.** The region in which the direct and indirect principal socioeconomic and
27 environmental justice effects of actions are likely to occur and are expected to be of
28 consequence.
29

30 **rem.** The dosage of ionizing radiation that will cause the same biological effect as 1 roentgen of
31 x-ray or gamma ray exposure. Acronym for roentgen-equivalent man.
32

33 **Remediation.** The process of cleaning up a site where a release of a hazardous substance has
34 occurred.
35

36 **Reprocessing (of nuclear fuel).** Processing of reactor irradiated nuclear material (primarily
37 spent nuclear fuel) to recover fissile and fertile material, in order to recycle the materials,
38 primarily for defense purposes. Historically, reprocessing has involved aqueous chemical
39 separations of desired elements (typically uranium or plutonium) from undesired elements in the
40 fuel.
41

42 **Research and Development land-use designation.** As presented in this environmental impact
43 statement, an area designated for conducting basic or applied research that requires the use of
44 a large-scale or isolated facility. Includes scientific, engineering, technology development,
45 technology transfer, and technology deployment activities to meet regional and national needs.
46 Includes related activities consistent with Research and Development.
47

48 **Reverse-well injection.** Process in which solutes are injected in an underlying geologic
49 formation through wells. During the early years of Hanford, waste solutions were pumped into
50 reverse wells as a method of waste disposal.
51

52 **Riparian habitat.** A specialized form of wetland restricted to areas along, adjacent to, or
53 contiguous with perennially flooded and intermittently flowing rivers and streams. Also,
54 periodically flooded lake and reservoir shore areas.
55

1 **Riprap.** A loose assemblage of stones that may be used in cap construction. In caps, riprap is
2 used as a capillary break to retard downward migration of water and to limit biointrusion.
3

4 **Risk.** Quantitative expression of possible loss that considers both the probability that a hazard
5 causes harm and the consequences of that event.
6

7 **Safety analysis report.** A report, prepared in accordance with DOE Orders 5481.1B and
8 5480.23, that summarizes the hazards associated with the operation of a particular facility and
9 defines minimum safety requirements.
10

11 **Sanitary waste.** Liquid or solid wastes that are not considered hazardous or radioactive,
12 generated as a result of routine operations of a facility.
13

14 **Saturated zone.** A subsurface area in which all pores are filled with water under pressure equal
15 to or greater than atmospheric pressure.
16

17 **Scope.** In an environmental impact statement, the range of actions, alternatives, and impacts to
18 be considered.
19

20 **Scoping process.** An early and open public participation process for determining the scope of
21 issues to be addressed and for identifying the significant issues related to a proposed action.
22

23 **Sedimentary interbeds.** Rock layers composed of materials, such as sand or gravel, which are
24 derived from the breakdown of various rocks and are layered between other rock types.
25

26 **Seismicity.** The phenomenon of earth movements; seismic activity. Seismicity is related to the
27 location, size, and rate of occurrence of earthquakes.
28

29 **Sensitive species.** A Washington State category for plant species considered vulnerable or
30 declining, that could become endangered or threatened without active management or removal
31 of threats. Also sometimes used as a generic term for any plant and wildlife species that are
32 threatened or endangered, rare, vulnerable or declining, or monitored by state or Federal
33 agencies.
34

35 **Seral shrub-steppe.** The developmental phase of a climax community with characteristic
36 structure and plant species composition. The shrub-steppe community is typically a disclimax
37 community of sagebrush and grasses caused by heavy grazing and wildland fire control policy.
38

39 **Shrub-steppe.** Typically a treeless area covered by grasses and shrubs and having a semiarid
40 climate. Precipitation is typically very slight, but sufficient to support the growth of sparse grass
41 and other plants adapted to living in conditions where water is scarce. Washington State
42 Department of Fish and Wildlife considers shrub-steppe a priority habitat.
43

44 **Solid waste.** Any garbage, refuse, or sludge from a waste treatment plant, water supply
45 treatment plant, or air pollution control facility and other discarded material, including, solid
46 liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining,
47 and agricultural operations and from community activities. Solid waste does not include solid
48 and dissolved material in domestic sewage, or solid or dissolved materials in irrigation return
49 flows, or industrial discharges which are point sources subject to permits under Section 402 of
50 the *Federal Water Pollution Control Act, as amended*, or source, special nuclear, or by-product
51 material as defined by the *Atomic Energy Act of 1954, as amended*.
52

53 **SO_x.** A generic term used to describe oxides of sulfur. The combination of sulfur oxides with
54 water vapor produces acid rain (see also, sulfur oxides).
55

1 **Stabilization (of waste sites).** Actions taken to reduce the environmental hazards associated
2 with an area used for disposal of hazardous and/or radioactive materials.
3

4 **Stakeholder.** Any person or organization with an interest in or affected by U.S. Department of
5 Energy activities. Stakeholders may include representatives from Tribal governments, Federal
6 agencies, state agencies, Congress, unions, educational groups, industry, environmental
7 groups, other groups, and members of the general public.
8

9 **Sulfur oxides.** Pungent, colorless gases formed primarily by the combustion of fossil fuels.
10 Sulfur oxides are considered to be major air pollutants and may damage the respiratory tract and
11 vegetation (see also, SO_x).
12

13 **Superfund.** The common name used for the *Comprehensive Environmental Response,*
14 *Compensation, and Liability Act of 1980* and its amendments.
15

16 **Surface water.** All waters that are open to the atmosphere and subject to surface runoff (rivers,
17 lakes, reservoirs, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other
18 collectors that are directly influenced by surface water.
19

20 **Surplus facility.** Any facility or site (including equipment) that has no identified programmatic
21 use and may or may not be contaminated with radioactive or hazardous materials to levels that
22 require controlled access.
23

24 **Syncline.** A fold in the rock structure inclining upward on both sides of a median axis as in a
25 downward fold of rock strata; opposite of anticline.
26

27 **Threatened species.** Any species that is likely to become an endangered species within the
28 foreseeable future throughout all or a significant part of its range.
29

30 **Transuranic waste.** Waste containing more than 100 nanocuries of alpha-emitting transuranic
31 isotopes, which have half-lives greater than 20 years, per gram of waste, except for
32 (1) high-level radioactive waste; (2) waste that the U.S. Department of Energy has determined,
33 with concurrence of the Administrator of the U.S. Environmental Protection Agency, does not
34 need the degree of isolation required by 40 CFR 191; or (3) waste that the U.S. Nuclear
35 Regulatory Commission has approved for disposal on a case-by-case basis in accordance with
36 10 CFR 61.
37

38 **Transmissivity.** A measure of the capacity of a water-bearing unit to transmit fluid. The
39 product of the thickness and the average hydraulic conductivity of a unit. Also, the rate at which
40 water is transmitted through an aquifer under a specific hydraulic gradient at a prevailing
41 temperature and pressure.
42

43 **Tritium.** A radioactive isotope of the element hydrogen, with two neutrons and one proton (H-3).
44

45 **Unconfined aquifer.** An aquifer that has a water table or surface at atmospheric pressure. At
46 Hanford, the unconfined aquifer is the uppermost aquifer and is the most susceptible to
47 contamination from Hanford Site operations.
48

49 **Vadose zone.** The area between the land surface and the top of the water table. Saturated
50 bodies, such as perched groundwater, may exist in the vadose zone. The vadose zone is also
51 known as the zone of aeration and the unsaturated zone.
52

53 **Vegetation type.** A classification of the plant community on a site based on the dominant plant
54 species in the community.
55

1 **Volatile organic compound (VOC).** Chemical containing mainly carbon, hydrogen, and oxygen
2 that readily evaporates at ambient temperature. Exposure to some organic compounds can
3 produce toxic effects on biological tissues and processes.
4

5 **Vulnerable aggregations.** Vulnerable aggregations are animal species that must aggregate at
6 some specific location and at a specific time to complete some action in their life cycle. These
7 aggregations include sage grouse, a bat colony, great blue heron at a nesting rookery, snakes in
8 a hibernaculum, migrating salmon at a river falls, elk herds during rut, etc. When these animals
9 aggregate, the species becomes vulnerable aggregations that can be severely impacted by
10 predators or disease.
11

12 **Waste management.** The planning, coordination, and direction of functions related to the
13 generation, handling, treatment, storage, transport, and disposal of waste, as well as associated
14 surveillance and maintenance activities.
15

16 **Waste minimization.** An action that economically avoids or reduces the generation of waste by
17 source reduction, reducing the toxicity of hazardous waste, improving energy usage, or
18 recycling. These actions are consistent with the general goal of minimizing present and future
19 threats to human health, safety, and the environment.
20

21 **Water level (water table).** The top elevation of the groundwater.
22

23 **Wetland.** Those areas that are inundated or saturated by surface water or groundwater at a
24 frequency and duration sufficient to support a prevalence of vegetation typically adapted for life
25 in a saturated soil environment. These areas are frequently transitional between terrestrial and
26 aquatic systems.
27

28 **Wilderness area.** An area formally designated by Act of Congress as part of the National
29 Wilderness Preservation System.
30

31 **Wild and Scenic River.** A portion of a river that has been designated by Congress as part of
32 the *National Wild and Scenic Rivers Act of 1968*.
33

34 **Withdrawn lands.** Withdrawn lands are lands DOE has "borrowed" from other Federal
35 agencies for DOE's mission. These lands could be either Public Domain lands (as in the case of
36 the BLM and some of the BoR lands) or lands that left the Public Domain and were subsequently
37 acquired by another Federal agency for their mission (i.e., BoR lands for the Columbia Basin
38 Irrigation Project) that were in turn borrowed by DOE for its mission.
39

40 **Worker.** Any person whose day-to-day activities are controlled by process safety management
41 programs and a common emergency response plan. When evaluating the potential
42 consequences of an accident, the worker is defined as an individual located within 100 m (328 ft)
43 downwind of the facility location where the accident occurs.
44

45 **Zoning.** A police power measure, enacted by general purpose unit of local government, in
46 which the community is divided into districts or zones within which permitted and special uses
47 are established as are regulations governing lot size, building bulk, placement, and other
48 development standards.
49

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Attn: Neva Corkrum, Chairman

General Accounting Office

Energy, Resources, and Science Issues

Attn: Vic Rezendes, Director

General Services Administration

Office of Business Performance

Attn: Constance Ramirez, Director, Cultural, Environmental, and Accessibility Programs

Grant County Commissioners

Attn: LeRoy Allison

Attn: Tim Snead

Attn: Deborah Moore

Grant County

Attn: Matt Morton, Planning Department

Grant County Economic Development Council

Attn: Terry Brewer

National Academy of Sciences

Board on Environmental Studies and Toxicology

Attn: James Reisa

National Marine Fisheries Service

Attn: William Steele

Attn: Merritt Tuttle

National Park Service

Attn: Dan Haas

Attn: Charles Odegaard

Nez Perce Tribe

Attn: Charles Hayes

Attn: Dan Landeen

Attn: John W. Stanfill

Attn: Stan Sobczyk

Attn: Donna Powaukee

Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards

Attn: Martin J. Virgilio, Deputy Director

Oregon Office of Energy

Attn: Mary Lou Blazek

Attn: Dirk Dunning

Pasco City Council

Attn: Ed Hargrow

Port of Benton

Attn: Ben Bennett

Attn: Bob Larson

Port of Mattawa

Attn: Mike Conley

Attn: Richard Leitz

Attn: Glen Leland

Portland Area Indian Health Services

Environmental Health and Engineers

Attn: Richard Truitt

Office of Management and Budget

Attn: Robert Fairweather, Chief, Environment Branch

U.S. Army Corps of Engineers

Office of Environmental Policy, CECW-AR-E

Attn: A. Forester Einarsen, NEPA Coordinator

U.S. Department of Agriculture

Natural Resources Conservation Service

Attn: Andree DuVarney, National Environmental Coordinator, Ecological Services Division

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

Attn: William Archambault

U.S. Department of Health and Human Services

Office of the Secretary

Attn: Richard Green, Environmental and Safety Officer

U.S. Department of Health and Human Services

Centers for Disease Control and Prevention

National Center for Environmental Health, Special Programs Group

Attn: Kenneth Holt

U.S. Department of Housing and Urban Development

Office of Community Viability

Attn: Richard Broun, Director

U.S. Department of Interior

Office of Environmental Policy and Compliance

Attn: Willie R. Taylor, Director

U.S. Department of Interior - Bureau of Reclamation

Attn: Jim Blanchard

U.S. Department of Interior - Bureau of Land Management

Attn: Joe Bussing

Attn: Jim Fisher

Attn: Jake Jakabosky

Attn: Cliff Ligons

Attn: Eric Stone

U.S. Department of Interior - U.S. Fish and Wildlife Service

Attn: Dave Goeke

Attn: Jeff Haas

Attn: Abby Kucera

Attn: Mike Marxen

Attn: William Shake, Regional Director

Attn: Preston Sleeper

U.S. Department of Justice

Environmental and Natural Resources Division

Attn: William Cohen, Chief, General Litigation Section

U.S. Department of Labor

Office of Standards, Regulation, and Variances

Mine Safety and Health Administration

Attn: Cherie Hutchison

U.S. Department of Transportation

Federal Highway Administration, Western Resource Center, Portland

Attn: Carl Armbrister, Director of Planning and Program Development

U.S. Department of Transportation

Office of Transportation Policy

Attn: Camille Mittleholtz, Environmental Team Leader

U.S. Environmental Protection Agency

Office of Federal Activities

Attn: William Dickerson, Director, NEPA Compliance Division

Attn: Marguerite Duffy, NEPA Compliance Division (staff level contact)

U.S. Environmental Protection Agency

Attn: Chuck Clarke, Region 10 Administrator

Attn: Larry Gadbois

Attn: Doug Sherwood

Attn: Randy Smith

Attn: Elaine Somers
Attn: Doug Woodfill

U.S. Environmental Protection Agency - Region 10

Office of Ecosystems and Communities

Attn: Richard B. Parkin (ECO-088), Manager, Geographic Implementation Unit

U.S. Geological Survey

Attn: Velvie Stockdale

U.S. Information Center for Environmental Management

Attn: Andrea Gralak

Wanapum People

Attn: Lenora Selatsee-Buck

Washington Department of Fish and Wildlife

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Attn: John Carleton

Attn: Ted Clausing

Attn: Jay McConnaughey

Attn: Neil Rickard

Washington State Department of Agriculture

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Washington State Department of Ecology

Environmental Review Section

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Washington State Department of Ecology

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Washington State Department of Health

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Washington State Department of Natural Resources

Attn: Mark Sheehan, Washington Natural Heritage Program

Washington State Department of Transportation

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Attn: Jim Zable

Washington State Historic Preservation Office

Attn: Allyson Brooks

Yakama Indian Nation

Attn: Leah Aleck

Attn: Barbara Harper

Attn: Russell Jim

Attn: Nanci Peters

INTEREST GROUPS:

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Attn: Kristen McDonald

Attn: Katherine Ransel

American Wildlands

Attn: Rob Ament, Executive Director

B Reactor Museum Association

Attn: Del Ballard

Attn: Gene Weisskopf

Attn: Gerald Woodcock

Central Washington Building and Construction Trades Council

Attn: Richard Berglund

Attn: Jim Worthington

Citizens for Environmental Justice, Inc.

Attn: Mildred McClain

Clean Water Action Project

Attn: Paul Schwartz, National Campaigns Director

Columbia River Conservation League

Attn: Richard Steele

Attn: Bob Wilson

Columbia River United

Attn: Greg deBruler

Council of Energy Resource Tribes

Attn: Merv Tano

Energy Communities Alliance

Attn: Seth Kirshenberq, Executive Director

Environmental Defense Fund, Inc.

National Headquarters

Attn: Fred Krupp, Executive Director

Environmental Defense Institute

Attn: Chuck Broschous, Executive Director

Environmental Management Advisory Board (EMAB)

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Attn: Jim Melillo, Executive Director

Greenpeace

Attn: Tom Clements

Government Accountability Project

Attn: Tom Carpenter

Hanford Action of Oregon

Attn: Robin Klein

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- Member: Shelley Cimon, Oregon Hanford Waste Board
- Member: James Cochran, Washington State University
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- Member: Harold Heacock, TRIDEC
- Member: Russell Jim, Yakama Indian Nation
- Member: Pat Kenny, Public-At-Large
- Member: Charles Kilbury, City of Pasco
- Member: Paige Knight, Hanford Watch of Oregon
- Member: Robert Larson, Benton-Franklin Council of Governments
- Member: Rick Leaumont, Lower Columbia Basin Audubon Society
- Member: Ken Niles, Oregon Office of Energy
- Member: Jerry Peltier, City of West Richland
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- Member: Elizabeth Tabbutt/Todd Martin, Washington League of Women Voters
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- Member: Jim Watts, Hanford Atomic Metal Trades Council
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Hanford Atomic Metal Trades Council

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Heart of America Northwest

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Inside Energy

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Institute for Energy & Environmental Research

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League of Women Voters

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Lower Columbia Basin Audubon Society

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Military Production Network

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National Audubon Society

Attn: Jeff Parsons, Executive Director, Washington State Office

National Congress of American Indians

Attn: JoAnn Chase, Executive Director

National Research Council

Board on Radioactive Waste Management

Attn: Kevin Crowley, Director

National Science Foundation

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National Trust of Historic Preservation

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National Water Resources Association

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National Wildlife Federation

Attn: Mark Van Putten, President and Chief Executive Officer

Natural Resources Defense Council, Inc.

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Nature Conservancy (The)

Western Regional Office

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Physicians for Social Responsibility

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Plutonium Challenge

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Rocky Mountain Elk Foundation

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Seattle Times

Attn: Danny Westneat

Sierra Club

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Tri-Cities Technical Council

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Tri-City Herald

Attn: John Stang

Tri-City Industrial Development Council

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Attn: Sam Volpentest

Washington Environmental Council

Attn: Jack de Yonge

Washington State University - Tri-Cities

Attn: Gene Schreckhise

READING ROOMS/PUBLIC LIBRARIES:

U.S. Department of Energy - Freedom of Information Reading Room
Washington, D.C.

Gonzaga University (Tri-Party Information Repository)

Foley Center
Attn: Connie Scappelli

Hanford Technical Library

Attn: Terri Traub

Library of Congress

Attn: Mark Holt

Mid-Columbia Library

Attn: Sue Lang

Office of Scientific and Technical Information

Attn: Doris Saylor

Portland State University - Branford Price Millar Library

Attn: Michael Bowman

Richland Public Library

Attn: Kathy Knutson

University of Washington - Suzzallo Library

Attn: Eleanor Chase

U.S. Department of Energy Public Reading Room - Tri-Cities

Attn: Terri Traub

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