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August 1997

EPA Superfund Record of Decision:

Hanford 100 Area (USDOE), 100-IU-1, 100-IU-3, 100-IU-4 & 100-IU-5 Operable Units, Benton County, WA 2/2/1996

File. 100-IU-1

COPY

DECLARATION OF THE RECORD OF DECISION

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SITE NAME AND LOCATION

USDOE Hanford 100 Area
100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units
Hanford Site
Benton County, Washington

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected action for portions of the U.S. Department of Energy (USDOE) Hanford 100 Area, Hanford Site, Benton County, WA, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Specifically, the selected action will address waste sites identified in the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units. These four operable units occupy portions of Benton, Franklin, and Grant Counties, WA. This decision is based on the Administrative Record for the 100 Area and for the specific operable units.

DESCRIPTION OF THE SELECTED REMEDY

No further action is required at the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units; however, USDOE commits to the development and implementation of a Mitigation Action Plan in coordination with the Natural Resource Trustees for any additional required mitigation measures.

DECLARATION

It has been determined no further remedial action is necessary at the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units. CERCLA expedited response actions (removals as described in 40 CFR 300.415) performed previously at these units from 1992 to 1994 have cleaned up all contaminants of concern to below the WAC 173-340 Washington State Model Toxics Control Act (MTCA) residential standards. The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) have determined these actions are protective of human health and the environment. Because the no-action alternative will not leave hazardous substances on-site above health-based levels, a five-year review does not apply.

HANFORD PROJECT OFFICE
FEB 16 1996
ENVIRONMENTAL PROTECTION AGENCY

Signature sheet for the Record of Decision for the USDOE Hanford 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Unit Remedial Action between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

John D. Wagoner

John D. Wagoner
Manager, Richland Operations
United States Department of Energy

2/12/96
Date

Signature sheet for the Record of Decision for the USDOE Hanford 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Unit Remedial Action between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

Chuck Clarke

Chuck Clarke
Regional Administrator, Region 10
United States Environmental Protection Agency

2/2/96
Date

Signature sheet for the Record of Decision for the USDOE Hanford 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Unit Remedial Action between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

Michael Wilson
Program Manager, Nuclear Waste Program
Washington State Department of Ecology

2/1/96
Date

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DECISION SUMMARY

1.0 INTRODUCTION

The U.S. Department of Energy's Hanford Site was listed on the National Priorities List (NPL) in July 1989 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The Hanford Site was divided and listed as four NPL Sites: the 100 Area, the 200 Area, the 300 Area, and the 1100 Area.

The decision made in this document is the final remedy for the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units, which are part of the 100 Area NPL site.

2.0 SITE NAMES, LOCATIONS, AND DESCRIPTIONS

2.1 Names and Locations

The Hanford Site is a 560-square mile federal facility located along the Columbia River in southeastern Washington State. The region consists of the incorporated cities of Richland, Pasco, and Kennewick (Tri-Cities) to the southeast of the site, and surrounding communities in Benton, Franklin, Grant, and Adams Counties (Figure 1). The 100 Area is located in the northern portion of the Hanford Site along the Columbia River, and covers approximately 468 km^2 (180 mi^2).

The area north of the Columbia River, known as the Wahluke Slope, covers approximately 364 km^2 (140 mi^2), and is separated from all other Hanford facilities by the river. The Wahluke Slope is the location of the 39 waste sites which make up the 100-IU-3 Operable Unit. The 100 Area south of the Columbia River includes the other three units addressed in this Record of Decision. The Riverland Rail Yard (100-IU-1 Operable Unit) is 34 km^2 (13 mi^2) in size, and is bordered by Washington State Highway 24 to the south and east, the Columbia River to the north, and the Hanford Site boundary to the west. The Sodium Dichromate Barrel Landfill (100-IU-4 Operable Unit) is 10.6 acres in size, and is located between the 100-D and 100-H reactor areas. The White Bluffs Pickling Acid Cribs (100-IU-5 Operable Unit) are cumulatively one-half acre in size, and are located about 2 km (1.2 mi.) west of the 100-F Reactor. Also south of the river are nine USDOE nuclear reactors which were used for plutonium production between 1943 and 1987. These reactor sites will be addressed under separate Records of Decision.

2.2 Topography

The topography of the 100 Area is marked by the Saddle Mountains to the north, and Gable Mountain/Gable Butte to the south, and is transected by the Columbia River. Washington State Route 24 traverses the Wahluke Slope from east to west. Semi-arid land with a sparse covering of cold desert shrubs and drought-resistant grasses dominate the Hanford landscape. Several wetlands are contained within the boundaries of the Wahluke Slope, mainly due to irrigation drainage. The geologic structure beneath the 100 Area is similar to much of the rest of the Hanford Site, which consists of three distinct levels of soil formations. The deepest level is a thick series of basalt flows which have been warped and folded, resulting in protrusions cropping out as rock ridges in some locations. Layers of silt, gravel, and sand known as the Ringold formation form the middle level. The Ringold Formation shows a marked west-to-east variation in the 100 Area. The uppermost level is known as the Hanford formation and consists of gravel and sands deposited by catastrophic floods during glacial retreat.

2.3 Water Resources

Groundwater flow in the unconfined aquifer is generally toward its discharge point, the Columbia River. Portions of the river's shoreline in the 100 Area are within the probable maximum 100 year flood plain of the Columbia River (Figure 2). Forty percent of the area's annual 6 1/4 inches of rain occurs between November and January. Due to irrigation practices, and in part to the semi-arid conditions, three wetland areas are contained within the Wahluke Slope.

2.4 Uses of Land and Natural Resources

Land use in the areas bordering the Hanford Site includes urban and industrial development, irrigated and dry-land farming, grazing, Native American uses, and designated wildlife refuges. Industries in the area are mostly related to agriculture and electric power generation. Wheat, corn, alfalfa, hay, barley, and grapes are major crops in the area.

Existing land use in the 100 Area includes the following land use categories: facility support, waste management, undeveloped land, and wildlife areas. Facility support activities include operations such as water treatment and maintenance of the reactor buildings. The waste management land use designation results from past-practice waste sites located mostly in the reactor areas. There are undeveloped lands located throughout the 100 Area. These areas are the least disturbed and contain minimal infrastructure. An approximate 20 mile stretch of the Columbia River is located within the 100 Area. Use of this portion of the river is mostly recreational. The shoreline of the Columbia River is a valued ecological area within the Hanford Site. Approximately 25% of the Wahluke Slope area is permitted to the U.S. Fish and Wildlife Service, and is managed at the Saddle Mountain National Wildlife Refuge, with limited public access. The remaining 75% is permitted to the Washington State Department of Wildlife, and is operated as a State Wildlife Recreation Area, which is open to the public during daylight hours.

Figure 1. Locations of 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units at the Hanford Site.

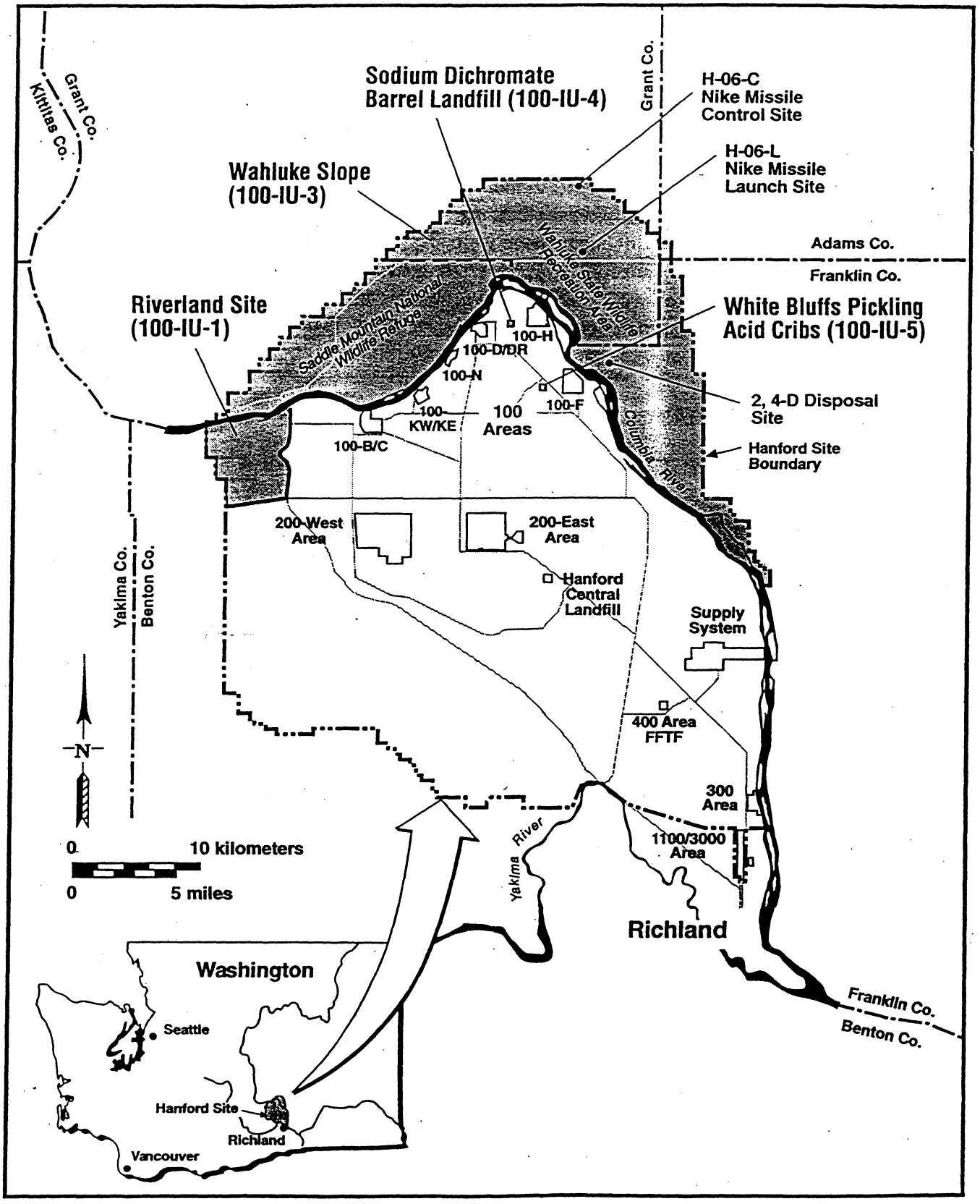

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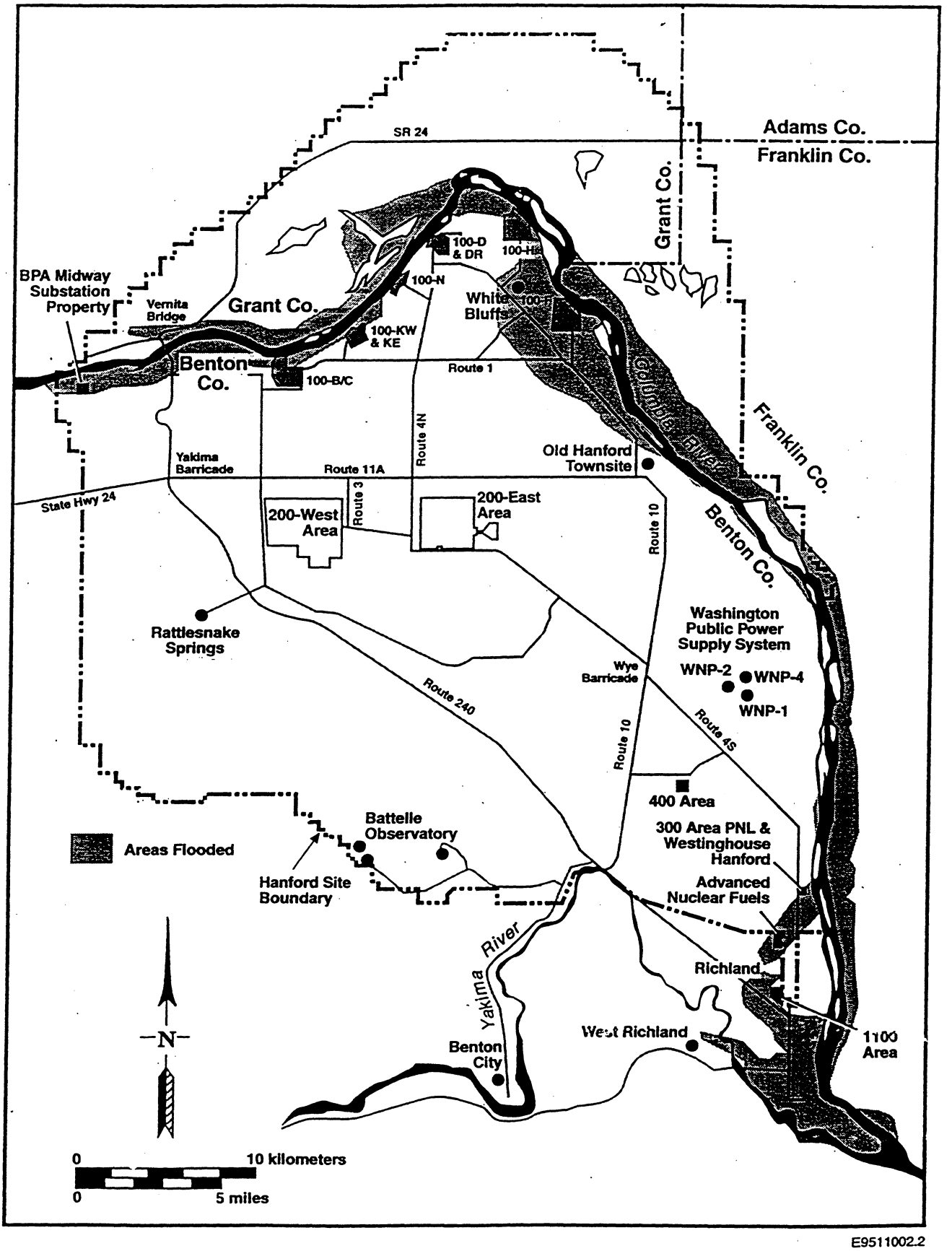
Figure 2. Area of Probable Maximum Flood, Hanford Site, Richland, Washington



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2.5 Nearby Receptors

The closest population center to the 100 Area waste sites is the Tri-Cities area, with approximately 100,000 residents. The Tri-Cities are located approximately 45 km (17 mi.) to the southeast of these waste sites. To the west, north, and east, the 100 Area are bounded by sparsely populated farming and ranching communities. To the south is the rest of the contiguous Hanford Site.

Ecological surveys and sampling have been conducted in the 100 Area, and in and along the Columbia River adjacent to the 100 Area. A summary of threatened and endangered species under the Endangered Species Act from those studies is presented in Table 1. Bird, mammal, and plant surveys were conducted and reported in *Fiscal Year 1991 100 Areas CERCLA Ecological Investigations*. Current contamination data have been compiled from other sources, along with ecological pathways and lists of all wildlife and plants at the site, including threatened and endangered species. This information has been published in *A Synthesis of Ecological Data from the 100 Areas of the Hanford Site*.

Table 1. Endangered and Threatened Species Potentially Found on the Hanford Site[1].

Species	Notes
Endangered Vascular Plants	
Persistentsepal yellowcress *(Rorippa columbiae)*	Known to have a scattered distribution because of specialized habitat requirements or habitat loss; generally occurs in marshy places; known to inhabit wet shoreline of Hanford Reach in Benton County
Northern Wormwood *(Artemisia campertris ssp borealis var workskioldii)*	Rare, local endemic species near the river; not known from the Hanford Site but reported just to the north near Beverly, Grant County
Threatened Vascular Plants	
Columbia milk-vetch *(Astragalus columbianus)*	Locally endemic to area near Priest Rapids Dam; could potentially occur in Northwest portion of the Hanford Site along the Columbia River
Hoover's desert parsley *(Lomatium tuberosum)*	Locally endemic to south-central Washington, including Benton County; known to inhabit rocky hillsides
Endangered Birds	
[2]Aleutian Canada goose *(Branta canadensis leucopareia)*	Only incidental occurrence at the Hanford Site.
American white pelican *(Pelecanus erythrorhynchus)*	Flocks have recently become common in the Columbia Basin during all seasons foraging on fish, amphibians, and crustaceans, and roosting on islands
[2]Peregrine falcon *(Falco peregrinus)*	Breeds and winters in eastern Washington, inhabiting open marshes, river shorelines, wide meadows, and farmlands; nests on undisturbed cliff faces; an erratic visitor to the Hanford Site
Sandhill crane *(Grus canadensis)*	Inhabits open prairies, grainfields, shallow lakes, marshes, and ponds; common migrant during spring and fall in Washington; some known and suspected nesting sites in eastern Washington; an occasional visitor at the Hanford Site
Threatened Birds	
[2]Bald eagle *(Haliaeetus leucocephalus)*	Regular winter visitor to the Columbia River, feeding on spawned-out salmon and waterfowl; they roost in the 100 Areas and nest (unsuccessfully to date) along the Hanford Reach
Ferruginous hawk *(Buteo regalis)*	Inhabits open prairies and sagebrush plains, usually with rocky outcrops or scattered trees; known to nest in Benton and Franklin Counties, including the Hanford Site; rarely winter in Washington, but are known to occasionally forage on small mammals, birds, and reptiles on sagebrush plains of the Hanford Site
Threatened Mammals	
Pygmy rabbit *(Sylvilagus idahoensis)*	Inhabits undisturbed areas of sagebrush with soils soft enough to permit burrows; once known to exist on the Hanford Site west of the 200 Areas plateau

[1]Additional information on threatened and endangered species and candidate species can be found in *Hanford Site National Environmental Policy Act Characterization* (PNL-6415 Rev. 7), C. E. Cushing, ed., September 1995.
[2]Indicates both state and federal designation.

3.0 SITE HISTORY

3.1 Hanford Site Background

The Hanford Site was established during World War II as part of the "Manhattan Project" to produce plutonium for nuclear weapons. Hanford Site operations began in 1943, with USDOE facilities located throughout the Site and the City of Richland. Certain portions of the Site are known to have cultural significance and may be eligible for listing in the National Register of Historical Places.

In 1988, the Hanford Site was scored using EPA's Hazard Ranking System. As a result of the scoring, the Hanford Site was added to the NPL in July 1989 as four aggregate areas (the 100 Area, the 200 Area, the 300 Area, and the 1100 Area). Each of these areas was further divided into operable units (a grouping of individual waste units based primarily on geographic area and common waste sources). In May 1989, in anticipation of the NPL listing, USDOE, EPA, and Ecology (the Tri-Parties) entered into a Federal Facility Agreement commonly known as the Tri-Party Agreement. This agreement established a procedural framework and schedule for developing, implementing, and monitoring remedial response actions at Hanford. The selected remedy presented in this record of decision addresses the 100-IU-1, 100-IU-3, 100-IU-4 and 100-IU-5 Operable Units.

3.2 100-IU-1

The Riverland Rail Yard (100-IU-1 Operable Unit, Figure 3) supported Hanford construction and operation activities from 1943 until 1954, while decontamination of radioactive rail cars continued until 1956. Included in this site are a 2,4-D pesticide container site, a rail yard maintenance facility, and two former military installations with associated demolition debris.

In a June 1993 Action Memorandum, signed by the Tri-Parties, the USDOE agreed to perform an expedited response action for the cleanup of the Riverland Rail Yard Maintenance Facility and pesticide container sites, and closure of an empty munitions cache hole. Diesel contaminated concrete and soil from the rail yard and pesticide sites were removed from the site for bioremediation. Sampling results indicated that levels of the contaminants remaining in the soil at the rail yard are below MTCA residential standards (Table 2). Radioactive decontamination of this facility occurred around 1963, after which the maintenance facilities were dismantled and sold. Follow-up radiological surveys were performed in 1977, 1978, and 1993, revealing only natural background levels. Also during the cleanup, a site containing 2,4-D pesticide containers was discovered, sampled, and cleaned up to MTCA residential standards. No groundwater contamination has been associated with the 100-IU-1 Operable Unit.

3.3 100-IU-3

Ownership of the Wahluke Slope is shared between USDOE and the U.S. Bureau of Land Management. Under an agreement with USDOE, approximately 25% of the Wahluke Slope (Figure 4) is managed as the Saddle Mountain National Wildlife Refuge by the U.S. Fish and Wildlife Service, allowing limited public access. The remaining 75% is permitted to the Washington State Department of Wildlife as the Wahluke Wildlife Recreation Area, and is open to the public during daylight hours. This area was acquired for use as a military buffer zone against potential hostile attacks on the 100 Area reactors. Several Anti-Aircraft Artillery Batteries and three Nike Missile Sites were located on the Wahluke Slope. These sites were decommissioned in 1960-1961, and demolished in 1974. Facilities handling radioactive materials were not built here, and surveys performed revealed only natural background levels.

During 1989 and 1990, an investigation of the Wahluke Slope was performed to assess potential health, safety, and environmental concerns raised by Ecology and the public. As a result of this investigation, a number of sites associated with military or homesteading activities (prior to 1943) were identified as potential threats to the environment. Many of the sites were landfills for former military installations. Based on the investigation, three of the Wahluke Slope sites, the H-06-L Nike missile launch site, H-06-C Nike missile control site, and the 2,4-D pesticide disposal site, were identified and included as part of the 100-IU-3 Operable Unit. During the course of the investigation associated with the 100-IU-3 Operable Unit, 36 additional sites were identified (Figure 4). Soil contamination in these areas resulted from historic use of petroleum products and pesticides by the military.

USDOE prepared an engineering evaluation and cost analysis, *North Slope (Wahluke Slope) Expedited Response Action Cleanup Plan* in 1993, regarding cleanup options applicable to the Wahluke Slope sites. The Tri-Parties signed an Action Memorandum in 1994, requiring removal of hazardous substances and proper abandonment of water wells. During 1994, a CERCLA expedited response action was performed to remove any hazardous substances that remained in the 39 sites on the Wahluke Slope. The cleanup results for the 39 100-IU-3 Operable Unit waste sites are documented in the *Close-Out Report North Slope (Wahluke Slope) Expedited Response Action, Hanford Washington*. Soil contaminated with the pesticide DDT and its associated breakdown products was disposed of at a hazardous waste landfill in Arlington, OR. Petroleum contaminated soil (PCS) was transported to a PCS treatment facility in Pasco, WA, for bioremediation. Several 55-gallon drums of miscellaneous and hazardous substances were sent to appropriate handling facilities. Non-hazardous trash, debris, and concrete were either returned to their excavations or recycled. Contaminants remaining in the 100-IU-3 Operable Unit waste sites were measured at levels below MTCA residential cleanup standards (Table 3).

Water wells were decommissioned in accordance with WAC 173-160 regulations (Minimum Standards for Construction and Maintenance of Wells) to eliminate this potential contamination path to groundwater, and to prevent interconnection of aquifers. No groundwater contamination has been associated with the 100-IU-3 Operable Unit.

3.4 100-IU-4

The Sodium Dichromate Barrel Landfill is the only waste site located within the 100-IU-4 Operable Unit. The landfill is located in a small depression between the 100-D and 100-H Reactor Areas (Figure 5). Little historical documentation of the site is available. The landfill was used during the years of reactor operation for disposal of crushed, empty Sodium Dichromate barrels. Sodium Dichromate was used as a corrosion inhibitor in the reactor cooling water systems of the 100 Area reactors. The site is not known to have received significant quantities of other waste types.

In 1992, Ecology and EPA recommended an expedited response action be performed at the Sodium Dichromate Barrel Landfill, after which USDOE prepared an engineering evaluation and cost analysis regarding remediation alternatives applicable to this unit (*Sodium Dichromate Barrel Landfill Expedited Response Action Proposal*). The Tri-Parties signed an Action Memorandum in 1993, requiring full excavation and removal of all buried materials from the landfill.

Excavation, removal, and disposal activities took place between March and July, 1993. Approximately 5,000 crushed drums were removed from the site, along with minor amounts of asbestos-containing materials, two 5-gallon roofing tar cans, and a small amount of used oil and grease. Soil sampling results indicated levels below MTCA residential cleanup standards were achieved (Table 4). No groundwater contamination has been attributed to the 100-IU-4 Operable Unit. Site radiation surveys performed revealed only natural background levels.

3.5 100-IU-5

The White Bluffs Pickling Acid Cribs Site (Figure 6) is the only site identified in the 100-IU-5 Operable Unit. The White Bluffs Area was the location of construction activities from about 1943 to 1959. After termination of construction activities, the White Bluffs construction support facilities were torn down. Other than the historical information obtained in the *Hanford Site Waste Management Unit Reports*, little is known about activities conducted at the site. It is believed the cribs received waste streams (primarily nitric and hydrofluoric acid etch solutions) from a pipe fabrication facility operating sometime between 1943 and 1959. The pipe fabrication facility location is suspected to have been northeast of the cribs in 100-IU-2 Operable Unit (White Bluffs Landfills and JA Jones 2 Construction site).

In 1992, EPA and Ecology recommended that USDOE perform an expedited response action for this site *(White Bluffs Pickling Acid Cribs Expedited Response Action Proposal)*. Characterization activities were conducted, determining the nature and extent of potential soil contamination by collecting surface and subsurface soil samples. Test pits were also used to verify the configuration of the piping system and provide a visual inspection of the crib construction. The excavated material (soil, cobbles) was returned to the cribs after the samples were collected.

Characterization activities indicated contaminants of concern were at levels below MTCA residential cleanup standards (Table 5). No investigation of the groundwater was completed for this unit due to its close proximity to other 100 Area operable units. The groundwater beneath this unit will be investigated as part of the 100-IU-2 Operable Unit (White Bluffs Townsite). No radioactive contamination has been associated with this unit.

Figure 3. Location of Sites Within the 100-IU-1 Operable Unit (Riverland Site).

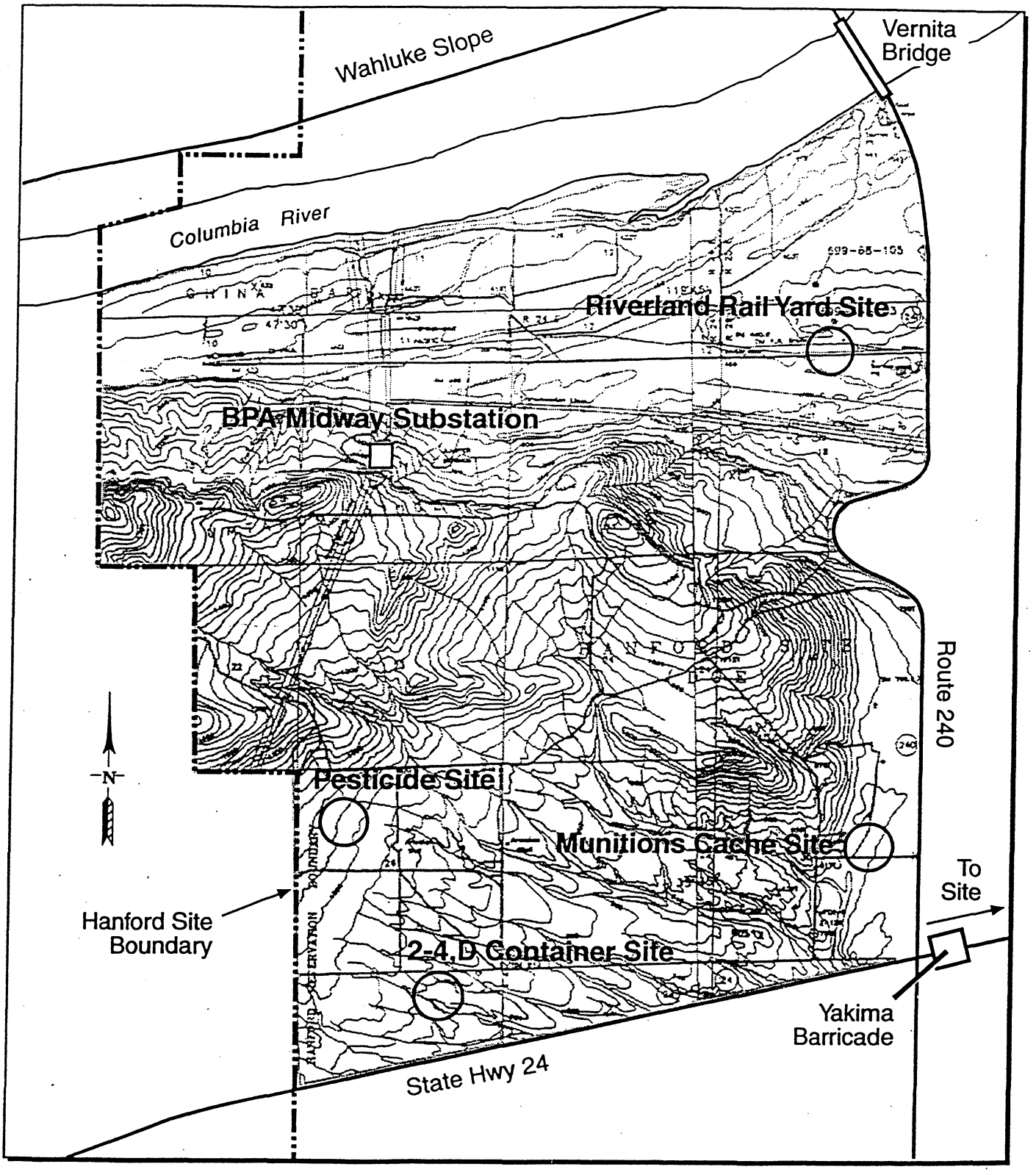

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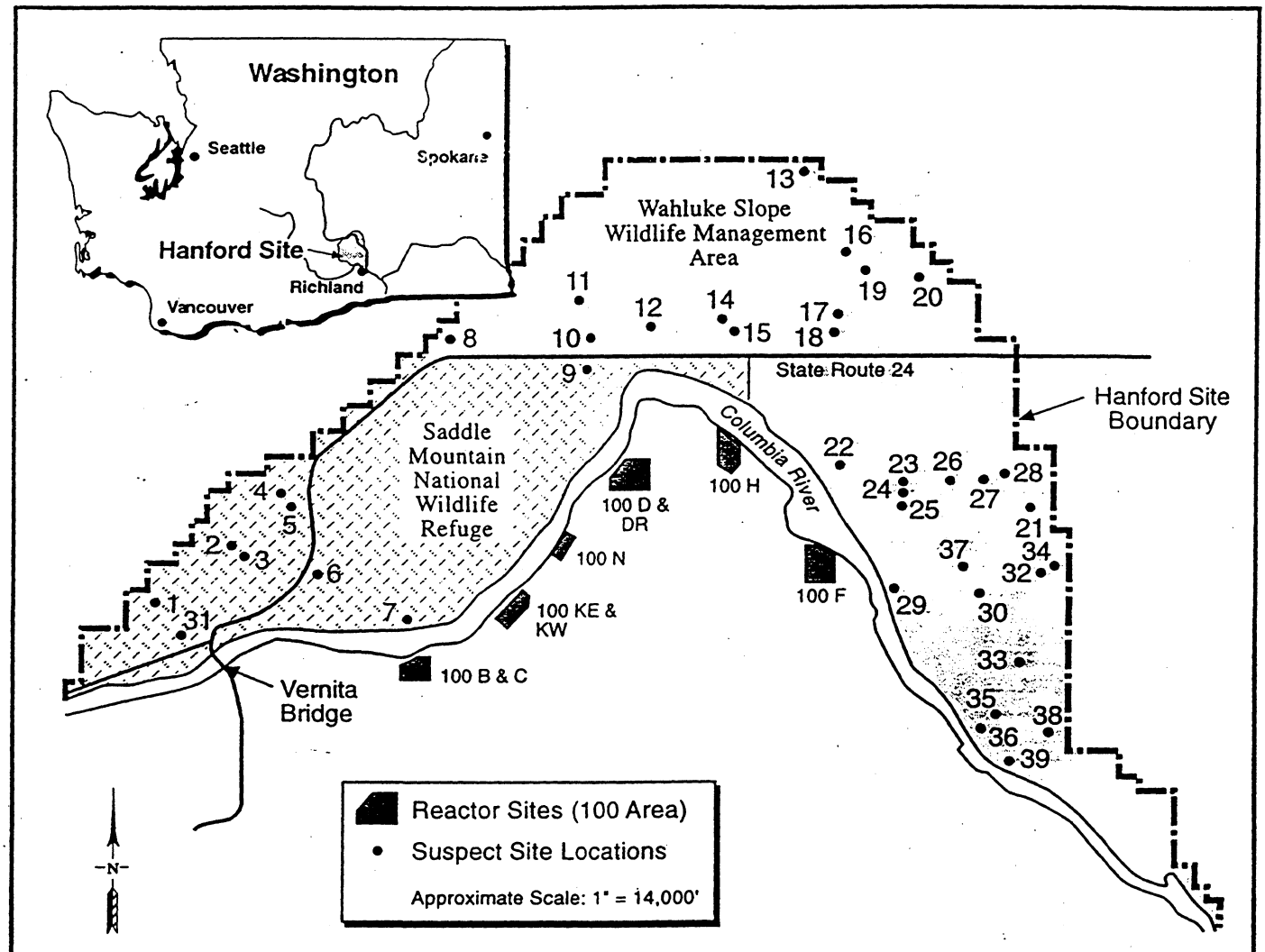
Figure 4. Location of Sites Within the 100-IU-3 Operable Unit (Wahluke Slope).



1. PSN 72/82
2. H-83C
3. H-81R
4. H-83L
5. PSN 80
6. Gravel Pit #47
7. Wahluke Schoolhouse
8. PSN 90
9. Asphalt Batch Plant
10. Gravel Pit #56
11. PSN 01
12. Igloo Site
13. H-06C
14. PSN 04
15. Radar Site
16. Wasteway Cistern
17. H-06L
18. PSN 07/10
19. Clay Pit Cistern
20. Cow Camp Cistern
21. Homestead Cistern
22. Shrapnel Site
23. H-12L
24. Asbestos Pipe Site
25. H-12R
26. H-12C
27. Construction Dump
28. PSN 12/14
29. 2, 4-D Burial Site
30. Wagon Road Cistern
31. Bridge Overlook Dump Site
32. Stock Tank Cistern
33. 12-3 Cistern
34. Dune Homestead
35. Coyote Bait Can
36. Overlook Cistern
37. Stove Cistern
38. Lonetree Homestead
39. Hanford Firing Range

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Figure 5. Location of the 100-IU-4 Operable Unit (Sodium Dichromate Barrel Landfill Site).

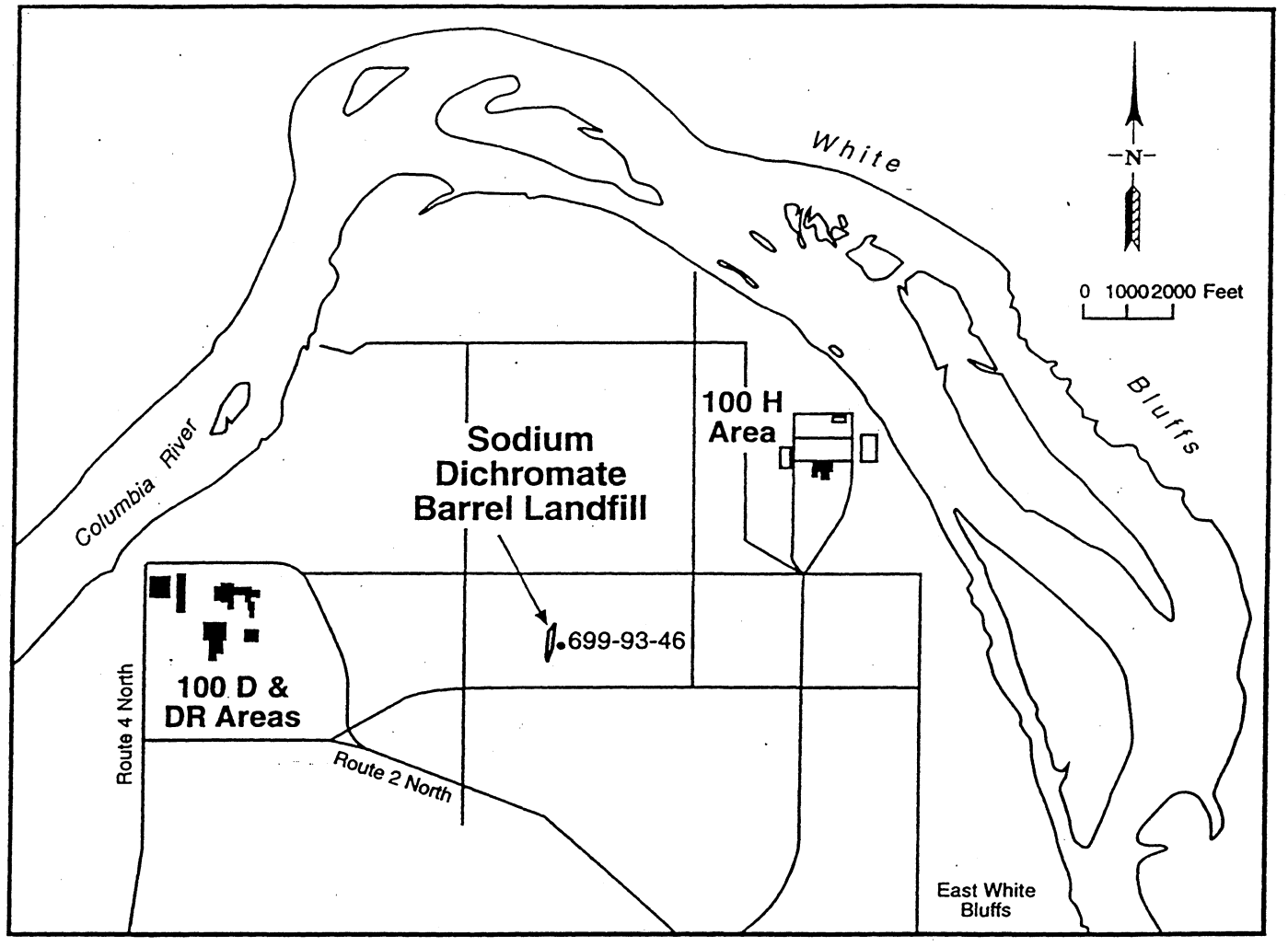

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Figure 6. Location of the 100-IU-5 Operable Unit (White Bluffs Pickling Acid Cribs).

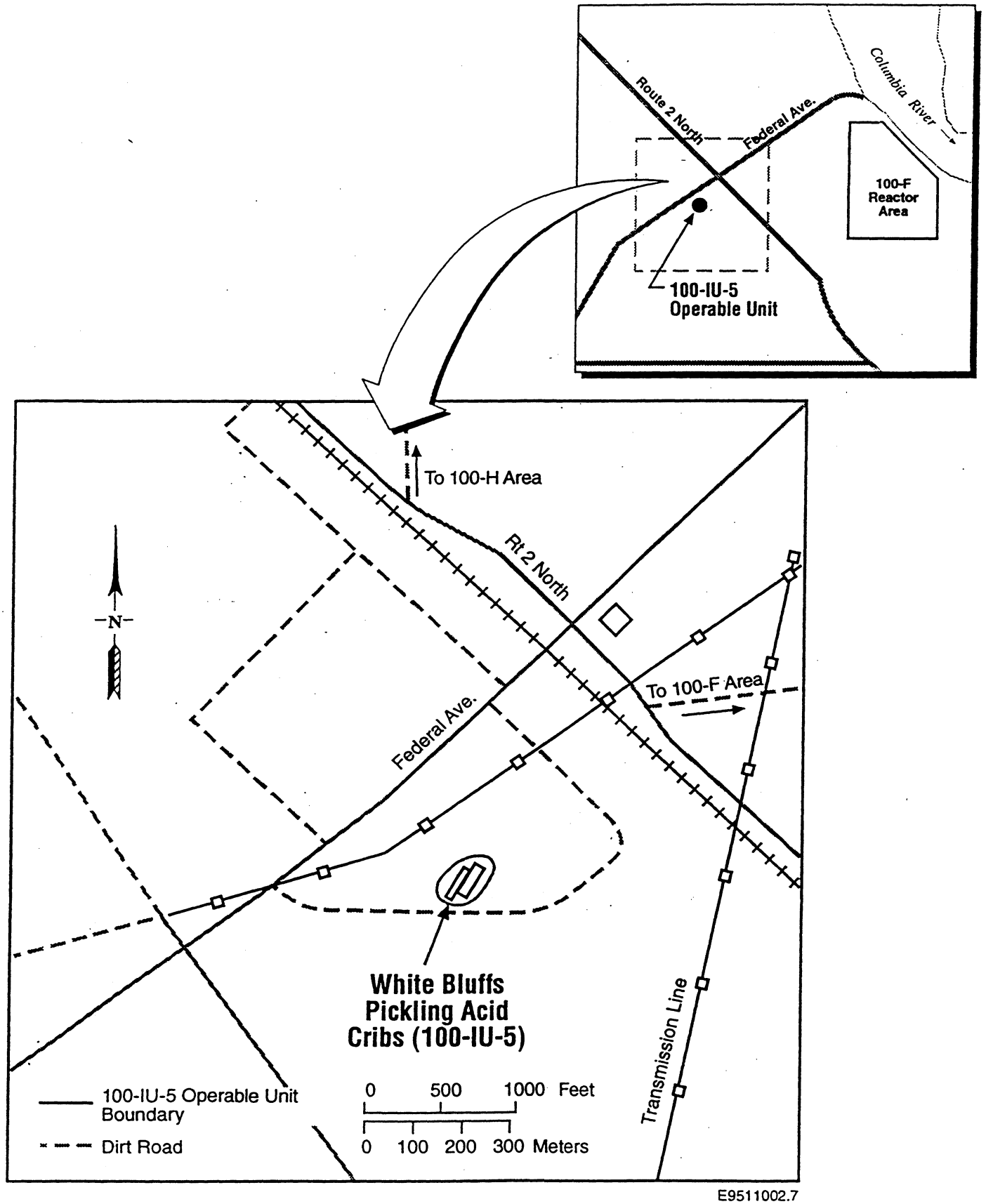

Table 2. Analytical Data Summary for Residual Soil Contamination at the 100-IU-1 Operable Unit (Riverland Sites).

Contaminant of Concern	Maximum Concentration	Background	Cleanup Level Used During Removal
2.4-D Pesticide Container Site			
Aldrin (mg/kg)	0.00045	ND	0.0588[1]
Dieldrin (mg/kg)	0.0036	0.0012	0.0625[1]
Rail Yard Maintenance Facility			
Diesel (mg/kg)	<2	--	200[2]
Heavy oil (mg/kg)	<2	--	200[2]

ND Not detected at specified level.

1. Based on *Model Toxics Control Act* (MTCA) Method B. Method B is applicable to all sites and provides a method for calculating cleanup levels based on health risks associated with a residential-use scenario.
2. Based on MTCA Method A. Method A identifies specific cleanup levels for 21 common contaminants, based on health risks associated with a residential-use scenario. Method A cleanup levels are intended for sites undergoing routine cleanup with relatively few contaminants.

Table 3. Analytical Data Summary for Residual Soil Contamination at the 100-IU-3 Operable Unit (Wahluke Slope).

Contaminant of Concern	Maximum Concentration	Average Background	Cleanup Level Used During Removal
Site H-06-L (Landfill Site)			
Arsenic (mg/kg)	8.81	3.30	20[1]
Chromium (mg/kg)	21.3	8.10	100[1]
Lead (mg/kg)	27.2	--	250[1]
DDD-4, 4' (mg/kg)	0.597	0.00802	4.170[2]
DDE-4, 4' (mg/kg)	1.660	0.00171	2.940[2]
DDT-4, 4' (mg/kg)	0.806	0.00534	1.000[1]
Petroleum hydrocarbons (mg/kg)	ND	ND	200[1]
Heavy oils (mg/kg)	ND	ND	200[1]
Site H-83-L (Debris Site)			
Petroleum hydrocarbons (mg/kg)	ND	ND	200[1]
Heavy oils (mg/kg)	ND	ND	200[1]
Site PSN-04 (Debris Site)			
Petroleum hydrocarbons (mg/kg)	ND	ND	200[1]
Heavy oils (mg/kg)	ND	ND	200[1]
Site PSN-90 (Oil Filter Site)			
Petroleum hydrocarbons (mg/kg)	ND	ND	200[1]
Heavy oils (mg/kg)	ND	ND	200[1]

NA Not applicable.
ND Not detected at specified level.
1. Based on *Model Toxics Control Act* (MTCA) Method A (see definition in Table 2).
2. Based on MTCA Method B (see definition in Table 2).

Table 4. Analytical Data Summary for Residual Soil Contamination at the 100-IU-4 Operable Unit (Sodium Dichromate Barrel Landfill).

Contaminant of Concern	Maximum Concentration	Background	Cleanup Level Used During Removal
Chromium (mg/kg)	86.7	--	100[1]

1. Based on *Model Toxics Control Act* (MTCA) Method A (see definition in Table 2).

Table 5. Analytical Data Summary for Residual Soil Contamination at the 100-IU-5 Operable Unit (White Bluffs Pickling Acid Cribs).

Contaminant of Concern	Maximum Concentration	Background	Cleanup Level Used During Removal
Chromium (mg/kg)	22.2	9.8	100[1]
Lead (mg/kg)	5.2	3.5	250[1]
Nickel (mg/kg)	16.5	9.9	--

1. Based on *Model Toxics Control Act* (MTCA) Method A (see definition in Table 2).

4.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

USDOE, Ecology, and EPA developed a Community Relations Plan (CRP) in April 1990 as part of the overall Hanford Site restoration. The CRP was designed to promote public awareness of the investigations and public involvement in the decision-making process. The CRP summarizes known concerns based on community interviews. Since that time, several public meetings have been held and numerous fact sheets have been distributed in an effort to keep the public informed about Hanford cleanup issues. The CRP was updated in 1993 and 1995 to enhance public involvement.

The *Proposed Plan for 100-IU-1, 100-IU-3, 100-IU-4 and 100-IU-5 Operable Units* was made available to the public in both the Administrative Record and the Information Repositories maintained at the locations listed below on June 26, 1995. Other documents relevant to this decision have been previously deposited in the Administrative Record and Information Repositories.

A fact sheet, which explained the proposed action, was mailed to approximately 1,500 people. In addition, an article appeared in the bi-monthly newsletter, the *Hanford Update*, detailing the start of public comment. The *Hanford Update* is mailed to over 5,000 people. The Proposed Plans were mailed to all of the members of the Hanford Advisory Board.

ADMINISTRATIVE RECORD (Contains all project documents)

U.S. Department of Energy
Richland Field Office
Administrative Record Center
740 Stevens Center
Richland, Washington 99352

EPA Region 10
Superfund Record Center
1200 Sixth Avenue
Park Place Building, 7th Floor
Seattle, Washington 98101

Washington State Department of Ecology
Administrative Record
300 Desmond Drive
Lacey, Washington 98503

INFORMATION REPOSITORIES (Contain limited documentation)

University of Washington
Suzzallo Library
Government Publications Room
Seattle, Washington 98195

Gonzaga University
Foley Center
E. 502 Boone
Spokane, Washington 99258

Portland State University
Branford Price Millar Library
Science and Engineering Floor
SW Harrison and Park
Portland, Oregon 97207

DOE Richland Public Reading Room
Washington State University, Tri-Cities
100 Sprout Road, Room 130
Richland, Washington 99352

The notice of the availability of these documents was published in the *Seattle PI/Times,* the *Spokesman Review-Chronicle*, the *Tri-City Herald,* and the *Oregonian* on June 25 and 26, 1995. Additional advertisements ran in the *Tri-City Herald* on July 23 and 25, 1995. The public comment period was held from June 26, 1995, through August 9, 1995.

Responses to the written comments received during the public comment period that were specifically relevant to the proposed plan are included in the Responsiveness Summary, which is attached as Appendix A of this Record Of Decision. This decision document presents the selected final action for waste sites in the 100-IU-1, 100-IU-3, 100-IU-4 and 100-IU-5 Operable Units at the Hanford Site, Richland, WA, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. The decision for these sites is based on the Administrative Record.

5.0 SCOPE AND ROLE OF OPERABLE UNITS WITHIN SITE STRATEGY

Due to its large size, the variety of potential contaminants, and the number of discreet sites, the 100 Area has been divided into 25 operable units. This Record of Decision addresses four of these operable units, the 100-IU-1 (Riverland Rail Yard), 100-IU-3 (Wahluke Slope), 100-IU-4 (Sodium Dichromate Barrel Landfill), and the 100-IU-5 (White Bluffs Pickling Acid Cribs) Operable Units.

Based on the results of the expedited response actions performed at these operable units, USDOE, EPA, and Ecology have determined these sites pose no current or future unacceptable risk to human health or the environment. Sampling performed indicated all contaminants had been removed to below MTCA residential cleanup standards. No further action was required to mitigate risk at these operable units. It was decided sufficient information had been collected during the investigations to justify proceeding directly to the proposed plan.

Because these sites were determined not to pose a significant threat, or to be a significant source of contaminants, USDOE, EPA, and Ecology have selected no further action as the final remedy for these operable units. Because the alternative will not leave hazardous substances on-site above health-based levels, a five-year review does not apply.

6.0 SITE CHARACTERISTICS

6.1 Known or Suspected Contaminants

As a result of previous investigations and field actions, all known sources or suspected sources of contamination have been cleaned up to levels below MTCA residential cleanup standards. Contaminants of concern included: the pesticides aldrin, dieldrin, and 2,4-D, as well as petroleum contaminated soil (PCS) at 100-IU-1; asbestos-containing materials, organic solvents, petroleum products, paint, grease, DDT and its breakdown products, and PCS at 100-IU-3; chromium at 100-IU-4; and spent nitric and hydrofluoric acids at 100-IU-5.

6.2 Groundwater

In the 100 Area, the unconfined aquifer is primarily found in the Ringold Formation with portions of the Hanford Formation locally included. The upper confined aquifer is contained in the basal Ringold Formation. The depth to groundwater ranges from approximately 12 meters near the river to 25 meters. The Ringold Formation is made up of a series of alluvial sands and gravels. The hydraulic conductivity for the Ringold Formation varies widely. It is estimated the hydraulic conductivity ranges from 0.2 to 1.5 feet/day at the three sites south of the Columbia River, and from 10 to 100 feet/day across the Wahluke Slope. Groundwater flow direction beneath the 100 Area is generally toward the regional discharge point, the Columbia River. Flow beneath the Wahluke Slope is heavily influenced by irrigation practices, including an east-west irrigation canal which flows across the northern part of the area.

6.3 Description Of Contamination And Affected Media

All known and suspected contaminant sources have been removed to below MTCA residential cleanup standards (Tables 2, 3, 4, and 5). Inert materials and debris were either removed from the site for recycling, or returned to the excavation. Site-by-site descriptions and dispositions of remediation wastes are summarized below:

6.3.1 100-IU-1

At the Riverland Rail Yard Maintenance Facility: About 340 cubic yards of concrete were removed and recycled; 430 cubic yards of diesel contaminated soil were removed from the site for bioremediation; several 2,4-D containers were sampled and designated as non-hazardous; and 27 55-gallon drums containing soil with residual aldrin and dieldrin waste were designated as non-dangerous waste and sent to the Hanford Central Landfill. Final sampling results were below cleanup levels.

6.3.2 100-IU-3

At the Wahluke Slope site: 600 cubic yards of DDT contaminated soil and 242 cubic yards of petroleum and 2,4-D contaminated soil were removed and disposed of at the Chemical Waste Management Facility in Arlington, Oregon; 200 cubic yards of petroleum contaminated soil were shipped to the New Waste Disposal Facility in Pasco, Washington, for bioremediation; five 55-gallon drums of waste contaminated with petroleum, pesticides, and paints were shipped to the Hanford 616 Facility; 64 quarts of lubricating oil were recycled; one 55-gallon drum containing a viscous tar-like material was shipped to the Hanford Central Landfill; and one 55-gallon drum containing paint waste was bulked with other paint waste and shipped to the 100-N Pad for disposition. Final sampling results were below cleanup levels.

6.3.3 100-IU-4

At the Sodium Dichromate Barrel Landfill: About 5,000 empty, crushed Sodium Dichromate drums and the surrounding soil were excavated, and disposed of at the Hanford Central Landfill, and did not designate as dangerous waste; minor amounts of asbestos-containing materials, two 5-gallon roofing tar cans, and a small amount of used oil and grease were sent to appropriate handling facilities. Final sampling indicated contaminants of concern were at or below background levels, and did not exceed cleanup levels.

Although groundwater monitoring results indicate the 100-HR-3 Groundwater Operable Unit has elevated chromium levels, these levels have not been attributable to the 100-IU-4 Operable unit. Groundwater beneath the 100-IU-4 Operable Unit is part of 100-HR-3 CERCLA Groundwater Operable Unit, and currently has an operational pump and treat system that is removing chromium from the groundwater.

6.3.4 100-IU-5

At the White Bluffs Pickling Acid Cribs site: Sampling results indicated that, with the exception of zinc, all site contaminants were below background concentrations. The elevated levels of zinc were in one sample, and were attributed to a piece of galvanized metal that was scraped during characterization activities, and not associated with former waste disposal activities. Final sampling results were below cleanup levels.

7.0 SUMMARY OF SITE RISKS

7.1 General

The primary basis for the no action decision is that the results of soil analyses taken at the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units were compared with background levels and MTCA residential values to determine whether the detected concentrations of chemicals exceeded screening concentrations (Tables 2, 3, 4, and 5). While there were certain constituents which were detectable above background concentrations, none of the contaminants of concern exceeded applicable MTCA residential cleanup standards. Because MTCA residential cleanup standards are designed to be protective at the 1×10^{-6} level (using MTCA standard exposure assumptions), achieving these cleanup levels result in a risk that will be in, or less than, EPA's acceptable risk range set in the NCP. Therefore, human health and ecological risk assessments were not performed at the 100-IU-1, 100-IU-3, and 100-IU-4 Operable Units. Results of the 100-IU-5 risk assessment are discussed below.

Ordnance surveys were required in the performance of the expedited response actions. A Hanford site-wide ordnance and explosives waste (OEW) archive search (*Ordnance and Explosive Waste Records Search Report*) was conducted by the U.S. Army Corps of Engineers, revealing minimal chance of any undiscovered OEW at the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units, as well as on the rest of the Hanford Site. The report concluded no further action is required for OEW mitigation at these operable units.

7.2 100-IU-5 Human Health Evaluation Results

All contaminants of potential concern except zinc were eliminated based on comparison to background concentrations. The maximum zinc concentration detected at the site was 1070 mg/kg, which is well below the most restrictive zinc soil concentration in the human health risk-based screening. Zinc was eliminated when compared to this risk based concentration, therefore, based on the human health risk assessment, there are no contaminants of concern for human health risk associated with the Pickling Acids cribs.

7.3 100-IU-5 Environmental Evaluation Results

Zinc concentrations were greater than Hanford Site background concentrations, and therefore retained for ecological evaluation. The highest zinc concentrations were taken directly beside underground pipes. The pipes were scraped during excavation and are likely the source of the zinc. Because the zinc was localized, not listed as a contaminant disposed of at the site, and the maximum detected zinc concentration was considered to be relatively non-toxic, zinc was not considered further as a contaminant of concern for ecological risk.

8.0 EXPLANATION OF SIGNIFICANT CHANGES

The *Proposed Plan for the 100-IU-1, 100-IU-3, 100-IU-4, AND 100-IU-5 Operable Units* was released for public comment in June 1995. The proposed plan identified no-action as the preferred alternative. USDOE, EPA, and Ecology have reviewed all written comments submitted during the public comment period. Upon review of these comments, it was determined no significant changes to the selected remedy, as originally identified in the proposed plan, were necessary.

9.0 DESCRIPTION OF THE NO-ACTION ALTERNATIVE

No further action is required at the 100-IU-1, 100-IU-3, 100-IU-4, and 100-IU-5 Operable Units; however, the USDOE commits to the development and implementation of a Mitigation Action Plan in coordination with the Natural Resource Trustees for any additional required mitigation measures.

APPENDIX A–

RESPONSIVENESS SUMMARY

This responsiveness summary addresses public comments specific to the *Proposed Plan for the 100-IU-1, 100-IU-3, 100-IU-4, 100-IU-5 Operable Units*. These written comments were submitted to Ecology during the public comment period, which opened June 26 and closed August 9, 1995.

1.0 SUMMARY OF PUBLIC COMMENTS

A total of two comments specific to the *Proposed Plan for the 100-IU-1, 100-IU-3, 100-IU-4, 100-IU-5 Operable Units* were received by Ecology.

2.0 RESPONSE TO COMMENTS

2.1 100-IU-1 Comment Summary:

Only two monitoring wells have been installed down-gradient of the former maintenance shop. The direction of the groundwater gradient cannot be determined without at least three monitoring wells. To ensure contamination did not escape to groundwater, it is necessary to sample down-gradient for diesel fuel and radionuclides.

Response:

The Riverland Railyard Maintenance Shop foundation and soil were removed. Analytical samples from both the drain area and the pit hoist indicated no contaminants above detectable limits. As a result, USDOE, EPA, and Ecology recommended no further action at this facility based on the fact that the soil below the facility indicates no contamination. EPA does not believe placing another well at the 100-IU-1 Operable Unit is necessary based on existing information.

2.2 100-IU-3 Comment Summary:

What environmental characterization of the demolished underground installations has been done at the 100-IU-3 Operable Unit?

Response:

As provided in Appendix C of the *North Slope (Wahluke Slope) Expedited Response Action Cleanup Plan*, in the mid-1970's the approximately 20-foot deep bunkers at the missile sites were blown up, and demolition debris from the surrounding structures was placed in the resulting

depression. Prior to this action, any salvageable material (e.g., piping, electrical lines, pumps, and other mechanical equipment) was removed from the site. As a cost saving measure, analogous site data was used to predict the probability of residual contamination at Wahluke Slope sites. The sampling of analogous sites on the Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE) provides strong evidence that the probability is very low of contamination being associated with the demolished missile bunker structures on the Wahluke Slope. Therefore, it was determined further characterization at these sites was not necessary.

USDOE performed pre-remedial action sampling of the NIKE missile bunker on the ALE in the summer of 1994. These bunkers remain largely intact. Results of these sampling activities are provided in *A Compendium of Field Reports for the Fitzner-Eberhardt Arid Lands Ecology Reserve Remedial Action, Hanford, Washington*. Dewatering sumps, one located in each bunker, were the only areas that exhibited contamination. PCB contamination of up to 150 $\mu g/100cm^2$ was found on the walls of these sumps. Subsequent testing of the soils at three sump water discharge points, found that the soil contained no evidence of PCBs, semi-volatile or volatile organics, or metals. It was later determined that the source of PCBs was probably the oil in the reservoirs of the existing operational sump pumps. As these pumps and their ancillaries would have been removed from North Slope sites prior to demolition, the probability of contamination via this route is very low.

Additionally, on the ALE site, soil gas surveys were performed at the drain field associated with the bunker. As noted in the *North Slope (Wahluke Slope) Expedited Response Action Cleanup Plan*, Appendix F, these drain fields could have received solvents that were disposed of through the sewer system. The soil gas surveys gave negative results for volatile organics.