



Environmental Assessment

Expansion of Borrow Areas on the Hanford Site

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

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ACRONYMS

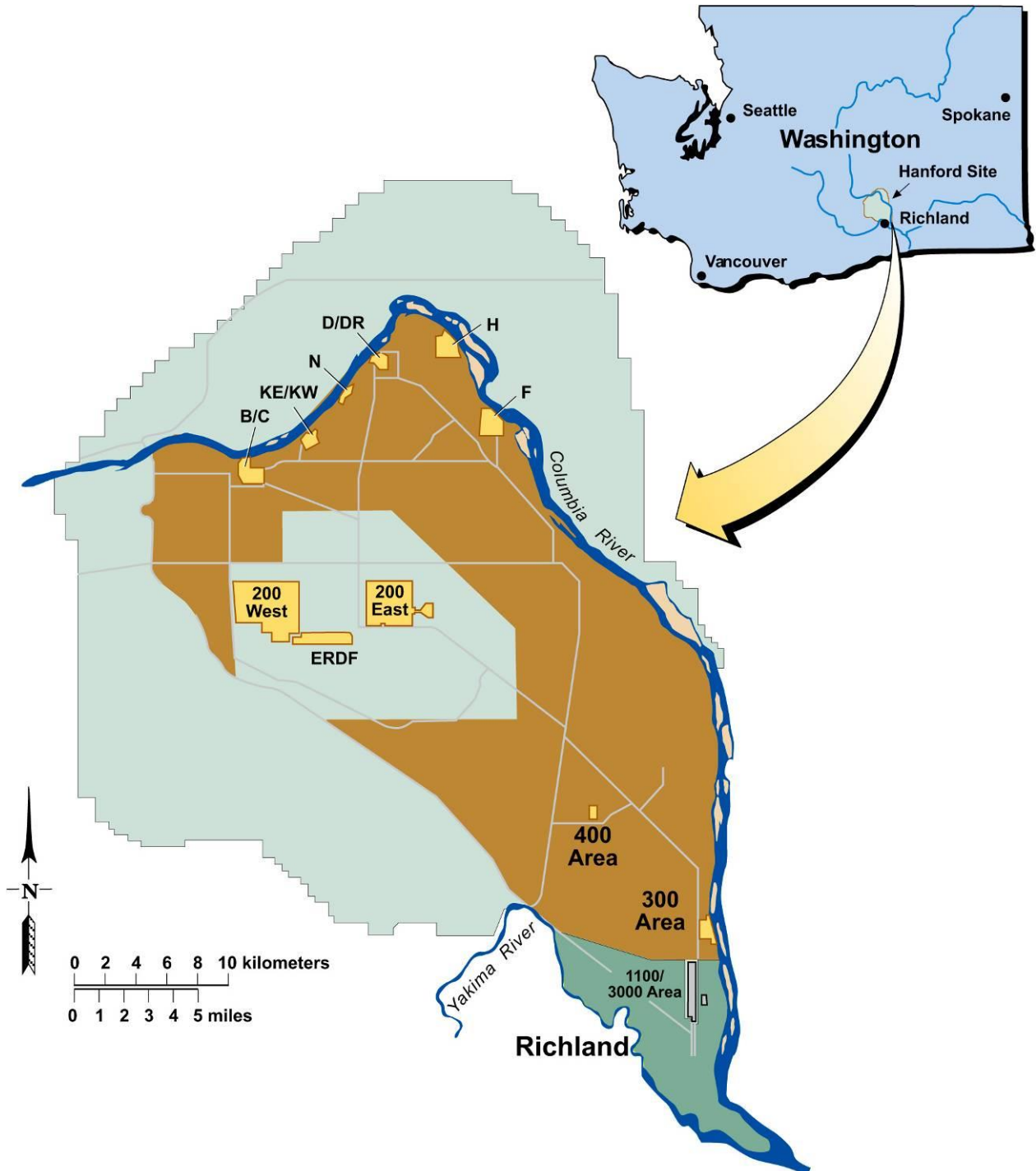
bcm	bank cubic meters
BRMaP	<i>Biological Resources Management Plan</i>
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act</i>
CFR	<i>Code of Federal Regulations</i>
CO	carbon monoxide
DOE	U.S. Department of Energy
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EF	emission factors
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FONSI	Finding of No Significant Impact
FR	Federal Register
FY	fiscal year
GHG	greenhouse gas
GIS	Geographical Information System
HCRC	Hanford Cultural Resource Case
MAP	mitigation action plan
MOA	memorandum of agreement
NAAQS	national ambient air quality standards
NEPA	<i>National Environmental Policy Act</i>
NHPA	<i>National Historic Preservation Act</i>
NO _x	oxides of nitrogen
PM	particulate matter
ROG	reactive organic gases
SO _x	oxides of sulfur
TCP	Traditional Cultural Property
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled
WAC	<i>Washington Administrative Code</i>
WTP	Waste Treatment Plant

1.0 PURPOSE AND NEED FOR AGENCY ACTION

Situated along the Columbia River in southeastern Washington, the U.S. Department of Energy's (DOE's) 1,517-km² (586-mi²) Hanford Site is undergoing extensive efforts to clean up contamination resulting from past nuclear defense research and development activities dating back to World War II (Figure 1-1). Cleanup activities can result in large excavated areas needing to be backfilled and revegetated. The purpose of the proposed action in this environmental assessment (EA) is to meet DOE's need to secure raw aggregate sand and gravel material (approximately 10,714,000 bank cubic meters [bcm]¹) to support ongoing environmental cleanup restoration projects (e.g., backfill of remediated waste sites), as well as construction and maintenance activities across the Hanford Site. While final remedial action decisions have yet to be made for some cleanup work, the proposed action would support the projected needs for sand and gravel for a period of approximately 10 years.

¹ In this assessment, a bank cubic meter refers to a volume of aggregate material in-place within the borrow pit area before it is disturbed. An assumption of a 15% "swell," or increase in the volume due to disturbance, is included in the volumes projected to meet the needs identified in this EA.

Figure 1-1. Hanford Site Map.



2.0 BACKGROUND

Historically, sand, gravel, and basalt materials extracted on the Hanford Site have been used in the following ways:

- As backfill for completing closure of waste sites
- As aggregate for concrete and roads
- As construction material for the Environmental Restoration Disposal Facility (ERDF) landfill disposal cells (interim cap and drainage layer)
- As general construction aggregate.

The “Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement” (64 FR 61615) provides overall guidance and direction for land management and land-use activities on the Hanford Site. Several preferred sources of borrow material on the Hanford Site are identified in Appendix D of the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)* (DOE/EIS-0222-F). Two subsequent *National Environmental Policy Act of 1969 (NEPA)* EA analyses performed in 2001 and 2003 addressed the use of specific borrow areas (DOE/EA-1454, DOE/EA-1403). These two EAs and resultant Finding of No Significant Impact determinations provided for the use of 27 borrow pits and 2 rock quarries, and for the potential 10% expansion of disturbed surface area at each borrow pit beyond the identified needs at that time. Of the 27 borrow pits considered in the *Environmental Assessment for Reactivation and Use of Three Former Borrow Sites in the 100-F, 100-H, and 100-N Areas, Hanford Site, Richland, Washington* (DOE/EA-1454) and the *Environmental Assessment for Use of Existing Borrow Areas, Hanford Site, Richland, Washington* (DOE/EA-1403), only Pits F, H, N, 6, 9, 18, 21, 23, 24, 30, and 34 continue to provide fill material and construction and road aggregate.

Planning, operations, and closure of borrow pits is conducted in accordance with a series of resource management plans that were written to implement the HCP EIS. These plans include the *Hanford Site Biological Resources Management Plan (BRMaP)* (DOE/RL-96-32), the *Hanford Site Biological Resources Mitigation Strategy* (DOE/RL-96-88), and the *Hanford Cultural Resources Management Plan* (DOE/RL-98-10).

Background

With the intent of identifying foreseeable needs for backfill of remediated waste sites, as well as for construction and maintenance activities across the Hanford Site, DOE has identified the need for approximately 10,714,000 bcm of sand and gravel materials. Eleven pits are being proposed for expansion or continued use in this EA to meet this need including Pits F, H, N, 6, 9, 18, 21, 23, 24, 30, and 34 (Figure 2-1), as well as a proposed new pit in the area between the 100-K and 100-N Reactor Areas (Pit 36). These pits have been identified with the goals of minimizing haul distances from borrow sources to remediation sites, minimizing greenhouse gas and other emissions, minimizing impacts to natural and cultural resources, and minimizing costs associated with excavating and transporting materials.

Figure 2-1. Location of Proposed Action Borrow Sites.



- Legend**
- Borrow Pits Proposed for Expansion
 - New Borrow Pit
 - 618-10
 - 618-11
 - Major Environmental Remediation Areas of the Hanford Site

Proposed Expansion of Borrow Pits on the Hanford Site
Benton County, WA

NOTES: Aerial Image, 2011, NAIP.

— Roads

0 1 2 3 4 5 Miles

N

Path: C:\Hanford\GIS\MapFiles\WCH\AllPits.mxd

3.0 PROPOSED ACTION AND ALTERNATIVE ACTION

The proposed action and the alternative action are discussed in the following sections.

3.1 PROPOSED ACTION

The DOE proposal would expand 11 active borrow pits on the Hanford Site that were included in DOE/EA-1403 and DOE/EA-1454, and would establish 1 new borrow pit source.

The borrow pits being proposed for expansion and development are for use in support of DOE missions for site cleanup and are considered pre-existing, nonconforming land-uses as described in the HCP EIS. The pits included in this EA would be located within industrial, conservation, low-intensity recreation, or preservation areas designated in the HCP EIS. The "Pre-existing, Nonconforming" policy allows for continuation of land uses that were established prior to HCP EIS land-use designation, such as borrow pits. Portions of the borrow pit areas proposed for expansion are located within 0.4 km (0.25 mi) of the Columbia River, within the Hanford Reach National Monument.

Under the proposed action, DOE would expand nine existing borrow sites located near remedial action project areas (Pits H, N, 6, 9, 21, 23, 24, 30, and 34) and establish one new borrow area in the 100 Area. In addition, Pits F and 18 are included in this EA for the purpose of documenting the lateral expansion of the current disturbed area. Continued use of Pits F and 18 is anticipated and it would include removal of material to a greater depth without lateral surface expansion. Inclusion of Pits F and 18 in this EA helps to ensure that future use would be managed within the authorized boundaries and that current borrow pit operational, mitigation, and closure requirements would be followed. The material would be used for backfill of remediated waste sites, as well as for construction and maintenance activities across the Hanford Site. Table 3-1 provides a description of the expected use of the material proposed to be removed from each pit. The borrow areas listed in Table 3-1 are being proposed for use based on their proximity to remediation activities. Expansion of the areas listed would provide borrow material at the shortest distance from remediation areas and would reduce environmental impacts and DOE costs associated with the transport of borrow materials.

The total volume of materials to be recovered over the duration of remedial actions in the areas supported by these borrow sites is estimated to be approximately 10,714,000 bcm. Based on needs as they were understood at the time of this assessment, this volume of sand and gravel material would support reasonably foreseeable needs associated with continued environmental cleanup restoration, as well as construction and maintenance activities for a period of approximately 10 years. These activities are largely identified in Tri-Party Agreement decisions such as *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) Records of Decision, Action Memoranda, and Explanations of Significant Differences. The estimated quantities and resulting impacts in terms of acreage reflect an analysis of currently known workscope, construction/remedial design, and as-left condition

Proposed Action and Alternative Action

assumptions. The evaluation integrated Geographic Information System (GIS) field-data of currently disturbed borrow pit areas with volumetric needs identified by DOE's contractors. The results of the volume and spatial analyses provide the number of acres that would be impacted under the Proposed Action (Table 3-1). Excavation of material would be limited to the areas described in this EA. Appendix A contains maps showing the current area of surface disturbance at each pit and the proposed expansion considered in this EA. Table 3-1 lists the volumes used to estimate the allowed expansion areas for each borrow pit and the anticipated use.

The proposed action would involve the removal of topsoil and vegetation at each of the proposed expansion areas and the one new borrow area in preparation for excavation and transport of aggregate material. In order to reduce environmental impacts, expansion of the pits would occur from the previously excavated areas outward, rather than inward from the new boundary whenever feasible. Prior to any material being excavated for use as backfill, the top 30 cm (12 in.) of topsoil would be stockpiled for redistribution across the disturbed area to facilitate successful revegetation. Dust suppression methods, such as application of water spray, would be implemented to control emissions of particulate matter. To ensure that borrow material is only removed from within the approved areas, pit boundaries would be marked in the field and each contractor would review their work control procedures. Borrow material would be excavated on an as-needed basis to ensure only the area needed for material is disturbed. For the proposed activities at borrow Pits N, 21, 23, and 36, borrow areas would be bermed around outside edges that would be visible from Traditional Cultural Properties (TCPs) to minimize potential adverse impacts during pit operations.

Table 3-1. Proposed Expansion Areas. (2 Pages)

Borrow Pit Name	Estimated Quantity (BCM)	Expansion Area (acres)	Total Disturbed Area (acres)	Maximum Depth (evaluation in meters)	Anticipated Project Use ^a
F	60,000	0 ^b	39.9	116	100-F waste site remediation backfill
H	266,000	10.6	34.3	117	100-H waste site remediation backfill
N	500,000	12.8	53.0	121	100-N demolition and waste site remediation backfill
6	1,300,000	28.0	97.7	108	300 Area 300-FF-2 Operable Unit demolition and waste site remediation backfill
9	432,000	11.6	70.3	110	300 Area demolition; 300 Area, 618-10 and 618-11 waste site remediation backfill
18	10,000	0 ^c	8.2	116	Not applicable
21	1,297,000	35.0	64.2	121	100-D demolition and wastes site remediation backfill

Proposed Action and Alternative Action

Table 3-1. Proposed Expansion Areas. (2 Pages)

Borrow Pit Name	Estimated Quantity (BCM)	Expansion Area (acres)	Total Disturbed Area (acres)	Maximum Depth (evaluation in meters)	Anticipated Project Use ^a
23	1,557,000	13.0	71.7	124	100-N, 100-K, 100-D demolition and waste site remediation backfill
24	872,000	16.5	65.0	123	100-B/C demolition and remediation backfill
30	2,664,000	19.0	142.0	126	Potential additional ERDF disposal cell construction; WTP construction
34	444,000	10.9	28.0	135	Waste site remediation backfill, primarily for central plateau
36 (new proposed pit)	1,312,000	30.0	30.0	124	100-N and 100-K demolition and waste site remediation backfill
Total	10,714,000	187.4	704.3		Totals, all pits combined

^a Indicates the anticipated use of borrow material. The anticipated use indication is not intended to limit the use of borrow material to only those uses listed. BCM is bank cubic meters, a measure that estimates the material volume “in the bank of the pit” before it is removed for transport. Typically, for dry sand and gravel the volume will swell by 15% from the time it leaves the bank of the pit until it is put into the truck for transport.

^b Quantity and acreage for Pit F reflects the currently disturbed area, including area beyond the boundary identified in DOE/EA-1454. No lateral expansion is anticipated.

^c Quantity and acreage for Pit 18 reflects the currently disturbed area, including area beyond the 2.0 ha (4.9 ac) identified in DOE/EA-1403. No lateral expansion is anticipated

BCM = bank cubic meters

ERDF = Environmental Restoration Disposal Facility

WTP = Waste Treatment Plant

After borrow materials are exhausted within a particular pit, slopes would be recontoured to blend with adjacent areas in a pattern that would support healthy establishment of native communities. Closure of pits would include revegetation in accordance with applicable Hanford Site management plans. A slope model of 4:1 was used to calculate borrow material quantities for each pit and would be utilized to provide stable slopes during excavations (Norman et al. 1997).

Groundwater elevations (hydraulic head) for the unconfined aquifer beneath each pit were obtained from available well-log data. These elevations were used to determine excavation limitations for each pit. Excavations would be limited to leave at least 2 m (6.6 ft) in depth from the bottom of the pit to the typical groundwater elevation. Due to variations in groundwater elevation, maximum pit depths were construed such that groundwater would not be present at surface levels long enough to sustain vegetation that only grows in a wet environment. In the unlikely event that groundwater is encountered, administrative controls, such as markers or a rope/stanchion barrier, would be used to eliminate the risk of equipment contacting groundwater.

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If groundwater was to remain for a sustained period, material would be placed in those areas to ensure they would not remain wetted. Table 3-1 lists the elevation that would be recommended for use as a maximum depth at each pit. Other considerations for maximum depth could include safety, aesthetics, and closure. Borrow pits located in the interior area of the Hanford Site, such as Pits 30 and 34, would be less likely to reach their maximum excavation depth than those closer to the groundwater table (Pits F, H, N, 6, 9, 18, 21, 23, 24, and 36). Dust suppression measures (e.g., water spraying) would be used during excavating, loading, unloading, and transporting of borrow pit materials, and during transportation on unpaved haul roads. Haul vehicles and excavators would use ultra-low sulfur fuels and be properly maintained to lessen potential impacts on air quality. Spill prevention and response plans would be implemented, and spill prevention materials would be kept on site. At permitted borrow areas, such as Pit 30, excavation activities would be conducted in accordance with the statewide *Sand and Gravel General Permit* (Ecology 2011) that sets discharge limits, and requires monitoring, inspections, implementation of best management practices, spill control measures, and waste disposal practices.

The proposed action also includes ensuring adequate road access for the expanded borrow locations included in this EA. Existing haul roads could require upgrades, and two new roads would be constructed for the transportation of borrow material at Pits 6 and 36. Appropriate utilities would be provided and may include portable generators or extension of power lines for lighting, installation of trailers for personnel, and portable toilets. Conventional industrial equipment would be used to excavate the borrow material. Equipment used to transport borrow material may include both conventional and nonconventional trucks.

Ecological and cultural resources reviews have been performed for the proposed action borrow pit areas. Where ecological reviews indicated the possibility of the presence of sensitive plant or animal species, an evaluation for these would be conducted prior to the start of project activities and appropriate mitigation measures would be implemented as provided in the BRMaP. In addition, project activities would be carried out in accordance with DOE/RL-98-10. Workers would watch for cultural materials during all work activities. If cultural materials were encountered during project activities, work in the vicinity of the discovery would stop until appropriate notifications and assessments are made and, if necessary, arrangements made for mitigation of the discovery.

Topsoil from the expansion areas of the borrow sites and surface materials from construction of roads would be stockpiled for future use in revegetation when closing the sites. Topsoil would be stockpiled for future use in approved areas, which may be inside, outside, or adjacent to the pit boundary. Mitigation actions pertaining to establishment and closure of the borrow pits, such as revegetation of borrow sites and haul roads, would be consistent with resource management plans that have been developed for the Hanford Site including the following:

- *Bald Eagle Site Management Plan for the Hanford Site, South-Central Washington* (DOE/RL-94-150)
- *Threatened and Endangered Species Management Plan: Salmon and Steelhead* (DOE/RL-2000-27)

Proposed Action and Alternative Action

- *Mitigation Action Plan for the 100 and 600 Areas of the Hanford Site* (DOE/RL-2001-22)
- *Hanford Site Biological Resources Management Plan* (DOE/RL-96-32)
- *Hanford Cultural Resources Management Plan* (DOE/RL-98-10).

The proposed action would take place over a period of approximately 10 years in support of DOE's environmental cleanup mission at the Hanford Site.

3.2 ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the proposed action are described in the following subsection.

3.2.1 No-Action Alternative

Under the No-Action Alternative, excavation of borrow materials would continue only in borrow areas that have not already reached their allowed maximum surface area disturbance, identified in DOE/EA-1403 and DOE/EA-1454. As such, borrow pits N, H, 9, 23, 30, and 34 would be used to supply backfill materials for remedial actions in the River Corridor and Central Plateau activities.²

Table 3-2 lists the additional projected miles that would be traveled by each remediation project to meet backfill needs under the No-Action Alternative. Figure 2-1 shows the relative locations of project areas to borrow areas.

² The potential use of an offsite borrow source was considered in the draft EA as part of the No-Action Alternative, Section 3.2.1. Use of an offsite borrow source was not carried forward in the final EA because such a scenario is believed to be speculative in nature and not reasonable based upon availability of onsite materials and projected needs (See Table 3-2).

Table 3-2. Additional Miles Traveled for the No-Action Alternative.

Project Area (Remediation and Demolition)	Proposed Alternative Borrow Pit	No-Action Alternative Borrow Pit	Additional Miles (One-Way)	Additional Miles
100-B/C	Pit 24	Pit 23	4.8	598,000
100-K	Pit 36 (new)	Pit 23	2.3	361,000
100-N	N Pit (limited use, 300,000 bcm remaining)	Pit 23 (after Pit N is exhausted in 2014)	2.3	108,000
100-D	Pit 21	Pit 23, 30	3.4	849,000
100-H	H Pit (limited use, 174,000 bcm remaining)	Pit 23, 30 (after Pit H is exhausted in 2015)	7.1	173,000
100-F	Pit 18, F	Pit 18, F	NA	NA
300 Area	Pit 6	Pit 9	2.5	464,000
618-10, 618-11	Pit 9	Pit 9	NA	NA
Central Plateau	Pits 30, 34	Pits 30, 34	NA	NA

NA = not applicable

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The following subsections describe the general Hanford Site environment, as well as the specific site environments for the locations of the proposed and alternative actions. Supplementary detail regarding the habitat and environs of the Hanford Site can be found in the *Hanford Site Environmental Report for Calendar Year 2011* (DOE/RL-2011-119) and *Hanford Site National Environmental Policy Act (NEPA) Characterization* (PNNL-6415).

4.1 GENERAL HANFORD SITE ENVIRONMENT

The Hanford Site lies within the Pasco Basin of the Columbia Plateau in southeastern Washington State. The site occupies an area of approximately 1,517 km² (586 mi²) located north of the city of Richland and the confluence of the Yakima and Columbia Rivers (HCP-EIS). This large area has restricted public access and provides a buffer for the areas on the Hanford Site that historically were used for production of nuclear materials, waste storage, and waste disposal.

The Hanford Site has a semiarid climate averaging 15 to 18 cm (6 to 7 in.) of annual precipitation, most of which takes place during the winter months, although annual precipitation averages have varied from 7.6 cm (3 in.) in 1976 to 31.3 cm (12.3 in.) in 1995. Average daily maximum temperatures range from 2 °C (35 °F) in late December and early January to 36 °C (96 °F) in late July. Monthly average wind speeds are lowest during the winter months, averaging 6 to 7 mph (10 to 11 km/h), and highest during the summer, averaging 13 to 14 km/h (8 to 9 mph) (PNNL-6415), with infrequent periods of high winds of up to 128 km/h (80 mph). Tornadoes are extremely rare; no destructive tornadoes have occurred in the region surrounding the Hanford Site. The probability of a tornado hitting any given location on the Hanford Site is estimated at 1 chance in 100,000 during any given year. The region is categorized as one of low to moderate seismicity.

The vegetation on the Hanford Site is a shrub-steppe community of sagebrush and rabbitbrush with an understory consisting primarily of cheatgrass (*Bromus tectorum*) and Sandberg's bluegrass (*Poa sandbergii*). As discussed in PNNL-6415, natural plant communities have been altered by Euro-American activities that have resulted in the proliferation of non-native species. Of the 590 species of vascular plants recorded for the Hanford Site, approximately 20% of all species are considered non-native. Biodiversity inventories conducted by The Nature Conservancy of Washington between 1994 and 1999 (TNC 1999) identified 85 additional taxa, establishing the actual number of plant taxa on the Hanford Site at 675. Cheatgrass is the dominant non-native species.

Several species of both plants and animals are under consideration for listing as a special status species by the federal government (none of these species are in the proposed action) and Washington State. Details are provided in PNNL-6415 and are incorporated by reference in this

EA. Relatively undisturbed areas of the mature shrub-steppe vegetation are high-quality habitat for many plants and animals and have been designated as "priority habitat" by Washington State.

Most mammals known to inhabit the Hanford Site are small, nocturnal species such as pocket mice and jackrabbits. Large mammals found on the Hanford Site consist of deer and elk, although the elk primarily reside on the Fitzner-Eberhardt Arid Lands Ecology Reserve in the Hanford Reach National Monument. Coyotes and raptors are the primary predators. Several species of small birds nest in the steppe vegetation. Semiannual peaks in avian variety and abundance occur during migration seasons.

Threatened and endangered plants and animals identified on the Hanford Site, as listed by the federal government (*Endangered Species Act of 1973* and *50 Code of Federal Regulations* [CFR] 402) and Washington State (*Washington Administrative Code* [WAC] 232-012-297 and Washington Natural Heritage Program 1997) are generally not found in the vicinity of the borrow sites. No plants or mammals on the federal list of threatened and endangered wildlife and plants are known to be on the Hanford Site. The bald eagle (*Haliaeetus leucocephalus*), however, is listed as State Sensitive and is a Federal Species of Concern. Additional details regarding the protection and enhancement of bald eagle habitats on the Hanford Site are provided in DOE/RL-94-150.

The Hanford Reach represents a unique ecosystem, stretching approximately 82 km (51 mi) from Priest Rapids Dam south to the start of Lake Wallula, north of Richland. Flow rates throughout the Hanford Reach are regulated by both the upstream Priest Rapids Dam and the downstream McNary Dam. Although daily fluctuations in flow occur in this stretch of the Columbia River, it is the only remaining free-flowing section of the Columbia River in the United States. The Columbia River provides valuable habitat for a variety of aquatic organisms. Of note, this section of river provides important spawning habitat for stocks of upriver bright fall Chinook salmon and white sturgeon. The Upper Columbia River spring run Chinook salmon, Middle Columbia River steelhead, and Upper Columbia River steelhead have been placed under the protection of the *Endangered Species Act of 1973*. These fish spawn in, or migrate through, the Hanford Reach. Additional details regarding the protection and enhancement of stocks of spring Chinook salmon and steelhead within the Hanford Reach of the Columbia River are found in the *Threatened and Endangered Species Management Plan: Salmon and Steelhead* (DOE/RL-2000-27).

4.2 SPECIFIC SITE ENVIRONMENT

Site-specific ecological resource reviews, cultural reconnaissance surveys, and literature searches were conducted for each of the proposed action areas. Results of these surveys are detailed in the following subsections. None of the proposed pit expansions presented would be located within a 100-year floodplain or wetland.

4.2.1 100-F Area Proposed Action Location

The 100-F borrow area lies within the perimeter of the 100-F Reactor Area, northwest of the 105-F Reactor (Appendix A, Figure A-1). A portion of the proposed borrow site in the 100-F Area is located within 0.4 km (0.25 mi) of the Columbia River in the area designated as the Hanford Reach National Monument. While this borrow area is not proposed for lateral expansion beyond what was previously analyzed in DOE/EA-1454, it remains active and, as part of this proposed action, would be subject to the proposed action related to operational practices, mitigation, and closure. The 100-F borrow area depth would not exceed an approximate elevation of 116 m (381 ft), which is approximately 2 m (7 ft) above the water table elevation.

There are no known plant or animal species of concern in the area. The vegetation within and near the borrow area consists of a sparse stand of small-stature gray rabbitbrush (*Ericameria nauseosa*) and a variety of understory species including cheatgrass (*Bromus tectorum*) and Sandberg's bluegrass (*Poa sandbergii*). No adverse impacts to ecological resources are anticipated with the continued use of this borrow area. Based upon the BRMaP requirements, there would be no mitigation actions required for continued use of this borrow area.

The proposed 100-F borrow pit expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the *National Historical Preservation Act of 1966* (NHPA) Section 106 process, or regularly used viewpoints such as the White Bluffs³ overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Potential visual resource impacts are discussed further in Section 5.1.7.

The 100-F Area borrow pit is not proposed for lateral expansion. The current borrow pit footprint was reviewed and surveyed for cultural resources under "Cultural Resource Review to Activate and Expand Borrow Pits at 100-F, 100-H, and 100-N Areas (HCRC#2003-100-001)" (CCN 103599). No historic properties or cultural resources were identified during the survey.

4.2.2 100-H Area Proposed Action Location

The existing 100-H borrow area is located at the southeast corner of the 100-H Area, directly adjacent to H Avenue on the east side (Appendix A, Figure A-2). A portion of this borrow site is located within 0.4 km (0.25 mi) of the Columbia River in the area designated as the Hanford Reach National Monument. The proposed action is to expand the existing borrow area by 4.0 ha (10.6 ac) (from 9.6 to 13.9 ha [23.7 to 34.3 ac]), a 45% expansion. Borrow area depth would not exceed an approximate depth elevation of 117 m (384 ft), which is approximately 2 m (7 ft) above the water table elevation.

³ The White Bluffs Overlook is an interpretive site and scenic viewpoint within the Hanford Reach National Monument. Located across the Columbia River from the proposed borrow area expansion sites, the overlook affords sweeping views of the Columbia River and the Hanford Site reactor areas and uplands.

The Washington State rare plant GIS database identifies an occurrence of Piper's daisy (*Erigeron piperianus*), a Washington State sensitive species in the area of the borrow pit. In addition, the BRMaP (DOE/RL-96-32) designates this species as a Level III resource⁴. Prior to borrow area operations, an evaluation for this species would be conducted each spring/summer to assess its presence and ensure mitigation in accordance with applicable DOE management plans (e.g., BRMaP). Mitigation for impacts to this species is replacement on a 1:1 per plant basis. This requirement would be captured in the annually updated ecological reviews. All proposed mitigation actions are documented in the *Expansion of Borrow Areas on the Hanford Site Mitigation Action Plan for DOE/EA-1934* (MAP) (WCH-561) for this EA. The proposed expansion area is sparsely vegetated with an overstory of gray rabbitbrush and mature stands of big sagebrush (*Artemisia tridentata*). The understory consists of a Sandberg's bluegrass/cheatgrass community with occurrences of other grasses and forbs. The previously mined areas of the pit have been revegetated with a high success rate of shrub survival and recruitment.

Due to the relatively low habitat quality, a Level II category, and small size of the expansion, adverse impacts to ecological resources would be minor. As described in the proposed action and as prescribed by the BRMaP, displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally.

The proposed 100-H Borrow Pit expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The 100-H borrow pit proposed action location was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the 100-H Borrow Pit in the 100-H Area of the Hanford Site, Benton County, Washington* (HCRC#2012-100-025). No historic properties or cultural resources were identified during the survey.

4.2.3 100-N Area Proposed Action Location

The proposed 100-N borrow pit is adjacent to and south of the Hanford Generating Plant (Appendix A, Figure A-3). A portion of the proposed borrow site in the 100-N Area is located within 0.4 km (0.25 mi) of the Columbia River in the area designated as the Hanford Reach

⁴ The BRMaP provides guidance based upon the level of resource management concern. Different management actions, such as monitoring and mitigation, are linked to specific types of biological resources. Through this management approach, specific management requirements do not apply equally to all species and habitats present on the Hanford Site. Currently, there are four levels of concern (Levels I-IV). Level I represents the lowest level of management concern; Level IV represents the highest. Each level has a specific set of management actions. Levels III and IV, for example, require mitigation.

National Monument. The proposed action is to expand the existing borrow area by 5.2 ha (12.8 ac) (from 16.3 to 21.2 ha [40.2 to 53 ac]), a 32% expansion. Within the previously mined area, vegetation is primarily devoid. The expansion area to the northwest contains mostly weedy species such as cheatgrass, tall tumbled mustard (*Sisymbrium altissimum*), and Russian thistle (*Salsola kali*). Species of concern have not been identified within the previously excavated areas nor within the proposed expansion area.

The pit expansion would not exceed an approximate depth elevation of 121 m (397 ft) (approximately 2 m [7 ft] above the highest water table elevation). No adverse impacts to ecological resources are anticipated during the continued use of this site. Mitigation per BRMaP, with respect to the use and expansion of this pit, would not be required as the expansion classifies as a Level I habitat.

The proposed 100-N Borrow Pit expansion location is not visible from key observation points such as the Columbia River or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the Traditional Cultural Property (TCP) known as the *Mooli Mooli* was submitted to the DOE. The new boundary encompasses the 100-N borrow pit proposed action location. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Potential adverse impacts to views from the *Mooli Mooli* TCP would be mitigated by berming the topsoil from the expansion area on the north, east, and south sides of the 100-N borrow pit expansion. Visual resources are discussed further in Section 5.1.7.

The 100-N borrow pit proposed action location was reviewed for cultural resources under *No Potential to Cause Effects (NPCE) Cultural Resources Review for the Ten Percent Expansion of the Borrow Pit at the 100-N Area* (NPCE#2011-100-011). This NPCE was written using information from previously consulted cultural resource reviews under the NHPA Section 106. Additionally, this area was entirely surveyed for cultural resources under *Fiscal Year 1991 Report on Archaeological Surveys of the 100 Areas (HCRC#91-100-CERCLA)* (Chatters et al. 1991). A portion of the proposed action location was surveyed under *Cultural Resources Review for Group 5, 100 K Remedial Action-Backfill (HCRC#97-100-013g)*. The proposed action location was completely surveyed for cultural resources in 2005 for a project called *Archaeological Survey for the Mile Long Trench Haul Road*; no HCRC# was assigned (Sharpe 2005). No historic properties or cultural resources were identified during these surveys or reviews.

4.2.4 Pit 6 Proposed Action Location

Pit 6, located off Route 4S, less than 0.4 km (0.25 mi) west of the 300 Area, remains active at this time (Appendix A, Figure A-4). The proposed action is to expand the existing borrow area by 11.3 ha (28 ac) (from 28.2 to 39.6 ha [69.7 to 97.7 ac]), a 40% expansion. The pit expansion would not exceed an approximate depth elevation of 108 m (354 ft) (approximately 2 m [7 ft] above the water table elevation). An additional 91.4-m (300-ft) long access road into the pit from Route 4S is also proposed as part of the proposed action.

Within the previously mined areas, vegetation is primarily devoid. The vegetation in the proposed expansion area primarily consists of antelope bitterbrush (*Purshia tridentata*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread grass (*Hesperostipa comata*), and Sandberg's bluegrass plant communities. Other vegetation observed in this area includes snow buckwheat (*Eriogonum niveum*), hoary aster (*Machaeranthera canescens*), and gray rabbitbrush.

Despite the observed occurrences of several native vegetative species, this expansion is a Level II resource and adverse impacts to ecological resources would be minor relative to the expansion and use of this site. As described in the proposed action and as prescribed by the BRMaP, displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally.

The proposed Borrow Pit 6 expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The Pit 6 proposed action location was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the Borrow Pit 6 in the 600 Area of the Hanford Site, Benton County, Washington (HCRC#2012-600-032)* and under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the Southern Expansion and Stockpile Areas for Borrow Pit 6 in the 600 Area of the Hanford Site, Benton County, Washington (HCRC#2012-600-037)*. No historic properties or cultural resources were identified during the survey.

4.2.5 Pit 9 Proposed Action Location

Pit 9 is located approximately 1 km (2 mi) north of the 300 Area and east of Route 4S (Appendix A, Figure A-5). The proposed action is to expand the existing borrow area by 4.9 ha (11.6 ac) (from 24 to 28.5 ha [58.7 to 70.30 ac]), a 20% expansion. The pit expansion would not exceed an approximate depth elevation of 110 m (361 ft) (approximately 2 m [7 ft] above the water table elevation). As part of an effort by DOE to mitigate the need for excavated sand and gravel resources, Pit 9 receives clean, inert Hanford Site construction and demolition waste for the purposes of re-use as backfill material. This process received EPA approval and is reflected in the relevant CERCLA work plans.

Pit 9 remains active and no substantial vegetative habitat exists within the active areas. The expansion area primarily consists of non-native species such as cheatgrass and tall tumbled mustard. The southern portion of this borrow area would remain as an inert landfill and thus, no mining would occur. No adverse impacts to ecological resources are anticipated during the expansion and use of this site as it is a Level I habitat.

The proposed Borrow Pit 9 expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The Pit 9 proposed action location was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the Borrow Pit 9 in the 300 Area of the Hanford Site, Benton County, Washington* (HCRC#2012-300-010). No historic properties or cultural resources were identified during the survey.

4.2.6 Pit 18 Proposed Action Location

Pit 18 is located directly adjacent to the east side of F Avenue, approximately 0.4 km (0.25 mi) north of where F Avenue intersects Route 2N south of the 100-F Area (Appendix A, Figure A-6). No lateral expansion would be necessary under the proposed action in this EA; however, to achieve project goals, this pit would remain active. The pit depth would not exceed an approximate elevation of 116 m (381 ft) (approximately 2 m [7 ft] above the water table elevation).

No plant or animal species of concern were found to occur within the action location. The vegetation within the previously mined portion consists of a sparse stand of small-stature gray rabbitbrush and a variety of mostly weedy understory species. No adverse impacts to ecological resources are anticipated during the use of this site as it consists of Level I habitat.

Borrow pit 18 is not visible from key observation points in the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

There is no current expansion proposed at Pit 18. The current borrow pit footprint was reviewed for impacts under *No Potential to Cause Effect (NPCE) Cultural Resources Review for the Use of Pit 18 in the 600 Area of the Hanford Site, Benton County, Washington* (NPCE#2006-600-010). Additionally, this area was completely surveyed for cultural resources under the *1995 WSU Archaeological Block Survey of the Hanford 600 Area* (HCRC#95-600-049) (Andrefsky et al. 1996). A portion of the proposed action location was surveyed *Cultural Resources Review for the Remediation of the 600-331 and 600-315 Waste Sites in the 600 Area* (HCRC#2011-600-025). No impacts to historic properties or cultural resources were identified during these surveys or reviews.

4.2.7 Pit 21 Proposed Action Location

The Pit 21 proposed action location parallels Route 2N, directly south of the 100-D/DR Area (Appendix A, Figure A-7). The proposed action is to expand the existing borrow area by 14 ha (35 ac) (from 12 to 26 ha [29.2 to 64.2 ac]), a 120% expansion. The pit expansion would not exceed an approximate depth elevation of 121 m (397 ft) (approximately 2 m [7 ft] above the water table elevation).

The previously mined areas are primarily devoid of vegetation; however, the equipment staging area and trailer areas were revegetated in 2011. The expansion area to the south has a mix of overstory species containing some sparse, mature big sagebrush and green rabbitbrush (*Chrysothamnus viscidiflorus*). Many other species of vegetation occur here ranging from cheatgrass and Russian thistle to yarrow (*Achillea millefolium*) and pale evening primrose (*Oenothera pallida*). There are several occurrences of starvation pricklypear (*Opuntia polyacantha*) and Carey's balsamroot (*Balsamorhiza careyana*) within the expansion area as well. There is a broken island within the expansion area designated in BRMaP as a Level III resource and would require mitigation in accordance with applicable DOE management plans. Compensatory sagebrush mitigation would be required on a 3:1 basis, by area, for this 1.1-ha (2.79-ac) island. As described in the proposed action and as prescribed by the BRMaP, displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally. All mitigation actions are identified in the MAP for this EA.

The proposed Borrow Pit 21 expansion location is not visible from key observation points such as the Columbia River, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. However, it is visible from the TCP known as *Mooli Mooli*, as identified through the NHPA Section 106 process. Between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the *Mooli Mooli* TCP was submitted to the DOE. The new boundary is in proximity to Pit 21. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Adverse impacts to views from the *Mooli Mooli* TCP would be mitigated by berming the topsoil from the expansion area on the west side of the Pit 21 expansion. Actions that would minimize impacts to visual resources are part of the proposed action are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

This area was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the Borrow Pit 21 in the 100 Area of the Hanford Site, Benton County, Washington (HCRC#2012-100-023) (HCRC#2012-100-023)*. No historic properties or cultural resources were identified during the survey.

4.2.8 Pit 23 Proposed Action Location

Pit 23 is located directly southeast of the intersection of Route 1 and Route 4N, south of the 100 Area (Appendix A, Figure A-8). The proposed action is to expand the existing borrow area

by 5.3 ha (13 ac) (from 24 to 29 ha [58.7 to 71.7 ac]), a 22% expansion. The pit expansion would not exceed an approximate depth elevation of 124 m (407 ft) (approximately 2 m [7 ft] above the water table elevation).

Vegetation within and surrounding the site consists of a variety of grasses, forbs, and shrubs. At the south end of the pit, both within and adjacent to the site, are mature stands of big sagebrush. Within the proposed expansion area to the east of the original pit boundary habitat is primarily poor, characterized by a Sandberg's bluegrass/cheatgrass community with sparse occurrences of native species such as bottlebrush squirreltail (*Sitanion hystrix*) and sand dropseed (*Sporobolus cryptandrus*).

The presence of high-quality native habitat is relatively low within this site. Adverse impacts to ecological resources would be minor relative to the expansion and use of this site as the expansion is characterized as a Level I resource. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally.

The proposed Borrow Pit 23 expansion location is not visible from key observation points such as the Columbia River or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. However, activity within the Pit 23 proposed action location would be visible from the TCP known as Gable Mountain. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Potential impacts to views from Gable Mountain TCP would be mitigated by berming the topsoil from the expansion area on the south side of the Pit 23 expansion. Visual resources are discussed further in Section 5.1.7.

The Pit 23 proposed action location was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for the Expansion of the Borrow Pit 23 in the 600 Area of the Hanford Site, Benton County, Washington* (HCRC#2012-600-034). No historic properties or cultural resources were identified during the survey.

4.2.9 Pit 24 Proposed Action Location

Pit 24 parallels Route 6 where it runs east/west about 0.8 km (0.5 mi) northwest of the 100-B/C Reactor Areas. Most of the borrow site is located within 0.4 km (0.25 mi) of the Columbia River, in the area designated as the Hanford Reach National Monument. The proposed action is to expand the existing borrow area by 7 ha (16.5 ac) (from 20 to 26 ha [48.5 to 65 ac]), a 34% expansion. The pit expansion would not exceed an approximate depth elevation of 123 m (404 ft) (approximately 2 m [7 ft] above the water table elevation).

The western active portion of the borrow pit is mostly nonvegetated gravel. The eastern (inactive) portion includes a wetted area of the pit that is dominated by willow, cattail, and invasive species including salt cedar (*Tamarix* sp.) and common reed (*Phragmites australis*). Following a previous pit expansion in the late-1990s, this area was identified for potential wetland habitat improvement in an otherwise non-vegetated borrow pit, since the bottom of the

pit was at the groundwater table. Removal of additional material from the eastern, wetted portion is not analyzed in this EA. *Draft Guidance on Identifying Waters Protected by the Clean Water Act*, Section 7 (EPA 2011), identifies categories of water generally not “waters of the United States” and not subject to the Clean Water Act. These categories, described in the preambles to the Clean Water Act regulations (51 FR 41217 and 53 FR 20765), remain unchanged in the draft guidance and include the following:

“Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States.”

Based on this information, until Pit 24 is closed and thus abandoned, no portion of it meets the definition of “waters of the United States.” There would be no impacts to the wetted portion of this site from the proposed action.

The area proposed for expansion is located west of the active borrow area and within an old farm field. The area is dominated by cheatgrass, sand dropseed, and slender sixweeks (*Festuca octoflora*) with sparse occurrences of mature spiny hopsage (*Grayia spinosa*). Other plant species occurrences observed during reconnaissance include Russian thistle and spring whitlowgrass (*Draba verna*).

Based upon low habitat quality and the relatively small expansion, no adverse impacts to ecological resources are anticipated during the expansion and use of this site. This expansion is characterized as a Level I habitat.

The proposed Borrow Pit 24 expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The Pit 24 proposed action location was reviewed and surveyed for cultural resources under *Cultural Resources Review for the Expansion of the Borrow Pit 24 in the 100 B/C Area of the Hanford Site, Benton County, Washington* (HCRC#2011-100-057). No new cultural resources were identified during the survey. One previously identified pre-Hanford farmstead is located within the Pit 24 Proposed Action location as part of *Cultural Resources Review for the Pit 24 Borrow Expansion* HCRC#98-600-005 and HCRC#98-600-005a. The pre-Hanford farmstead at this location, known as the Fry and Conforth Farm, was determined eligible to the National Register of Historic Places (NRHP). The Washington State Department of Archaeology and Historic Preservation signed the “Memorandum of Agreement for Mitigation of the Fry and Conforth Farm (HT-95-050)” (Griffith 1998); the Advisory Council on Historic Preservation signed the “Memorandum of Agreement Regarding the Expansion of Gravel Pit 24, Hanford Site, WA” (Crisler 1998). The Pit 24 proposed action location was reviewed and surveyed for cultural resources under cultural resources review HCRC#2011-100-057. The finding of this

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cultural resources review was No Adverse Effect to Historic Properties. No new historic properties or cultural resources were identified during the survey.

All mitigation has been completed for the impacts to the farmstead. The cultural resources review finding indicated that the proposed project activity would result in “no adverse effect” to historic properties as long as the following specific stipulations were upheld:

- A temporary boundary marker would be established to protect the remaining portions of the farmstead.
- Intermittent cultural resources monitoring will be conducted and would focus on the near-surface excavations.

4.2.10 Pit 30 Proposed Action Location

Pit 30 is located to the west of the 200 East Area, directly northwest of where Route 3 and Route 4N intersect (Appendix A, Figure A-10). The proposed action is to expand the existing borrow area by 8 ha (19 ac) (from 50 to 58 ha [123 to 142 ac]), a 15% expansion. The pit expansion would not exceed an approximate depth elevation of 126 m (413 ft) (approximately 2 m [7 ft] above the water table elevation).

The vegetation for the requested expansion area and the east side of the borrow pit primarily consists of a big sagebrush/Sandberg’s bluegrass and cheatgrass community. Other vegetation observed in the requested expansion area includes antelope bitterbrush and a variety of other forbs and grasses. Of note, Washington State’s rare plant GIS plant database identifies an observance of Piper’s daisy in the area of the borrow pit. The Washington State Natural Heritage Program identifies Piper’s daisy as a state sensitive species. The BRMaP designates this species as a Level III resource. This species would need to be monitored each spring/summer in order to assess its presence and determine a mitigation plan in accordance with applicable DOE management plans (e.g., BRMaP). Compensatory sagebrush mitigation would be required on a 3:1 basis by area. As described in the proposed action and as prescribed by the BRMaP, displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally. All proposed mitigation actions are captured in the MAP for this EA.

The proposed Borrow Pit 30 expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The Pit 30 proposed action location was reviewed for cultural resources under *No Potential to Cause Effects (NPCE) Cultural Resources Review for the Expansion of Pit 30* (NPCE#2008-

600-014). Additionally, the proposed action locations was surveyed for cultural resources under *Cultural Resources Review of Retrieval, Treatment and Disposal of Tank Waste and Closure of Single Shell Tanks (Tank Closure) Environmental Impact Statement (EIS)* (HCRC#2003-200-044), *Expansion of Gravel Pits 23 and 30 Project, A Cultural Resources Inventory Project (HCRC#93-600-002)* (O'Neil and Crist 1993), and *Cultural Resources Report Narrative: Spent Nuclear Fuel Storage Facility* (HCRC#94-600-042). No historic properties or cultural resources were identified during these surveys or reviews.

4.2.11 Pit 34 Proposed Action Location

Pit 34 is located on the east side of the 200 West Area, approximately 0.4 km (0.25 mi) southwest of the Route 3 and Route 3N intersection (Appendix A, Figure A-11). The proposed action is to expand the existing borrow area by 4.4 ha (10.9 ac) (from 7 to 11.3 ha [17.1 ac to 28 ac]), a 64% expansion. The pit expansion would not exceed an approximate depth elevation of 135 m (443 ft) (approximately 2 m [7 ft] above the water table elevation).

The vegetation within the expansion area is primarily gray rabbitbrush, cheatgrass, and Sandberg's bluegrass. The present high-quality habitat of mature big sagebrush in the vicinity of Pit 34 would not be impacted by pit use in the proposed expansion area. As described in the proposed action and as prescribed by the BRMaP, displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities have been implemented in a given area, some wildlife species would return to the area naturally. No adverse impacts to ecological resources would be anticipated during the expansion and use of this site as it is a Level I resource.

The proposed Borrow Pit 34 expansion location is not visible from key observation points such as the Columbia River, TCPs identified through the NHPA Section 106 process, or regularly used viewpoints such as the White Bluffs overlook or the Umtanum Ridge overlook located along State Route 24. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Visual resources are discussed further in Section 5.1.7.

The Pit 34 proposed action location was reviewed and surveyed for cultural resources under *No Historic Properties Affected (NHPA) Cultural Resources Review for a Borrow Pit 34 Expansion in the 200 Area of the Hanford Site* (HCRC#2011-200-054). No historic properties were identified during the survey.

4.2.12 Pit 36 Proposed Action Location

The new proposed Pit 36 borrow location and associated access roads would be located directly east of the 100-K Area, approximately 0.90 km (0.56 mi) south of the Columbia River (Appendix A, Figure A-12), outside of the Hanford Reach National Monument. Removal of borrow material from the new Pit 36 under the Proposed Action would result in a maximum surface disturbance of 12 ha (30 ac), corresponding to a volume of approximately 1,312,000 bcm. New roads to access the pit would be 790 m (2,600 ft) long and 9 m (30 ft)

wide. The use of this proposed pit would not exceed an approximate depth elevation of 124 m (407 ft) (approximately 2 m [7 ft] above the water table elevation). When it was found that expansion of the existing N Pit to meet future borrow needs would not be feasible, this location was selected to provide borrow material for projects in the 100-K and 100-N Areas.

The proposed action location for Pit 36 is in an area that has previously received extensive disturbance. Besides sparse occurrences of gray rabbitbrush, the dominant vegetation is primarily cheatgrass and tall tumbled mustard. Some scattered big sagebrush, mariposa lily (*Calochortus macrocarpus*), yellow salsify (*Tragopogon dubius*), and shaggy fleabane (*Erigeron pumilus*) were observed.

No adverse impacts to ecological resources would be anticipated during the use of this site. Mitigation per BRMaP would not be required as this expansion is a Level I habitat.

The new Pit 36 borrow area in the proposed action was identified to support the 100-N and 100-K remediation projects. Material needed to support ongoing remediation will exceed the borrow material allowed under previous EAs for the existing Pit N. Location of a new borrow area to the west of 100-N is proposed in order to avoid physical impacts to the *Mooli Mooli* TCP. The proposed shape of Pit 36 is sinuous, in order to better blend with surrounding topography, and would be flanked to the east by stockpiled topsoil to create additional visual camouflage while the pit is active. Measures that would be taken in the future to address visual resources as part of the proposed action are described in Section 3.1 of this EA. The Pit 36 proposed action location was reviewed and surveyed for cultural resources under *Cultural Resources Review for the Design, Construction, and Continued Use of Borrow Pit 36 Located in the 100-K Area of the Hanford Site, Benton County, Washington* (HCRC#2012-100-024). The proposed action at the Pit 36 location is visible from the TCP known as *Mooli Mooli*, as identified through the NHPA Section 106 process. Actions that would minimize potential impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Adverse impacts to views from the *Mooli Mooli* TCP would be mitigated by berming the topsoil from Pit 36 along the north side of the pit. Visual resources are discussed further in Section 5.1.7.

The Pit 36 borrow pit proposed action location was reviewed and surveyed for cultural resources under HCRC#2012-100-024. No historic properties or cultural resources were identified during the survey. The Hanford Site TCP known as the *Mooli Mooli* is located within 0.50 km (0.31 mi) of the proposed action location. The finding of HCRC#2012-100-024 was No Adverse Effect to Historic Properties. However, consulting parties raised concerns regarding potential impacts to the TCP, *Mooli Mooli* during the Section 106 30-day review period and during the EA comment period. DOE continues to consult on Pit 36.

5.0 CUMULATIVE IMPACTS AND ENVIRONMENTAL CONSEQUENCES DISCUSSION

5.1 CUMULATIVE IMPACTS OF THE PROPOSED ACTION

Section 4.0 of this EA discussed the specific environments that would be affected by the proposed action. This section discusses the cumulative impacts from expansion, development and continued routine operation of the borrow areas evaluated within this EA. The expansions and new borrow area proposed in this EA and the evaluation of the resulting impacts reflect the reasonably foreseeable needs for sand and gravel to support ongoing remediation of the Hanford Site for approximately 10 years. The actions that DOE takes to clean up contamination resulting from past nuclear defense production activities are largely identified Tri-Party Agreement decisions such as CERCLA Records of Decision, Action Memoranda, and Explanations of Significant Differences. The proposed action would support the projected needs based on current remedial and removal action decisions and the estimated volumes needed to fulfill the requirements in those decision documents. Final remedial action decisions have yet to be made for some cleanup work, and if there are any future needs for sand and gravel exceeding the areas addressed in this EA, those needs would be evaluated in a future NEPA review. Because the proposed action includes measures to avoid and/or minimize potential adverse impacts as cleanup work continues, compelling cumulative impacts would not be anticipated under the proposed action. Geologic materials as a resource would not be affected because the proposed geologic materials would be used to replace geologic materials that were contaminated and removed during remediation to a location on the Hanford Site. The geologic materials addressed in this EA are clean and would be placed in remediated areas. There would be no net gain, loss, or degradation of the geologic materials on the Hanford Site. As noted in this summary, some expected impacts on other resources are addressed in the MAP for this EA.

5.1.1 Health and Safety

No radiological or toxicological exposure to personnel or the general public would be expected to occur as a result of routine excavation operations, either loading or offloading activities, since borrow materials would be obtained from uncontaminated areas and delivered to remediated areas. The materials would be handled in a manner consistent with commercial industrial quarry activities, along with dust suppression practices widely used on the Hanford Site. The use of appropriate personal protective clothing, specific training, and equipment safeguards would be adequate to ensure the safe recovery and handling of this material.

5.1.2 Air Quality

During the transfer of material from borrow areas and during transportation of borrow pit materials, gaseous and particulate pollutants would be generated at the borrow pits. Air quality impacts would be due principally to exhaust emissions from earth-moving equipment and vehicles (primarily haul trucks) and fugitive dust (particulate matter [PM]) emissions from excavation, loading, and transportation of borrow pit materials. Dust-suppression methods, such

as application of water spray, would be implemented to control emissions of PM during excavating, loading, unloading, and transporting borrow pit materials and on topsoil stockpiles, as needed. Since the proposed expansion of borrow pits would result in continuation of an existing ongoing practice of removal and use of borrow pit material, no substantial increase in overall air emissions would be envisioned to result from the Proposed Action Alternative.

The Proposed Action to expand the borrow pits would mitigate additional miles that would be traveled by the haul trucks to obtain borrow materials under the No-Action Alternative, which would also result in the consumption of more fuel and an increase in air pollutants. The estimated haul truck distance traveled under the proposed action is 5,062,330 km (3,145,586 mi). The estimated miles from the No-Action Alternative for obtaining borrow material from currently approved onsite borrow sources is 10,962,198 km (6,811,594 mi), resulting in 54% more fuel consumption and air emissions than the Proposed Action.

An estimate of the annual air emissions for greenhouse gases, criteria pollutants, and toxic air pollutants was prepared for the Proposed Alternative and the No-Action Alternative. Air dispersion modeling via a screening-level analysis was conducted to demonstrate projected PM emissions from onsite borrow source operations.

5.1.2.1 Greenhouse Gas Emissions. The primary air emission from vehicles is carbon dioxide, which is considered a greenhouse gas. Greenhouse gases are gaseous constituents of the atmosphere, both natural and resulting from or produced by human beings that absorb and emit thermal infrared radiation (heat) emitted by the Earth’s surface, the atmosphere itself, and clouds. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the primary greenhouse gases in the Earth’s atmosphere. Greenhouse gases trap heat between the Earth’s surface and the lower part of the atmosphere; this phenomenon is called the greenhouse effect. The maximum annual amount of greenhouse gases emitted during the Proposed Action Alternative and No-Action Alternative has been estimated based on established emission factors and estimated fuel consumption by the haul trucks and excavators (Appendix B) and is summarized in Table 5-1.

Table 5-1. Maximum Annual Greenhouse Gas Emissions.

Proposed Action	No-Action Alternative
1,754 metric tons/year (1,932 tons/year) CO ₂ e	3,170 metric tons/year (3,492 tons/year) CO ₂ e

The Proposed Action greenhouse gas emissions are expected to be comparable to previous years’ emissions from the ongoing use of borrow pits on the Hanford Site. By way of comparison, the total greenhouse gas emissions from mobile sources (primarily fleet vehicles) on the Hanford Site in 2011 and 2010 were 43,617 metric tons/year CO₂e and 33,590 metric tons/year CO₂e, respectively (HNF-53104).

5.1.2.2 Criteria and Toxic Air Pollutants. In addition to greenhouse gas emissions, the haul trucks and excavators would emit criteria and toxic air pollutants. Criteria pollutants include volatile organic compounds, also known as reactive organic gases, carbon monoxide (CO),

oxides of nitrogen (NO_x), oxides of sulfur (SO_x), and PM. Particulate matter of concern, and thus regulated by state and federal regulations, are small-diameter components (i.e., PM₁₀ [particles 10 micrometers in diameter or smaller] and PM_{2.5} [particles smaller than 2.5 micrometers in diameter]). Emissions of SO_x would be mitigated by the use of ultra-low sulfur fuel. Potential emissions of criteria pollutants have been estimated along with emissions of toxic air pollutants associated vehicle operations for benzene, formaldehyde, acetaldehyde, and 1,3-butadiene for the Proposed Action Alternative and the No-Action Alternative (Appendix B). Maximum annual emissions are summarized in Table 5-2. Since the proposed expansion of borrow pits would result in continuation of an existing ongoing practice of removal and use of borrow pit material, no substantial increase in overall air emissions would result from the Proposed Action Alternative. Based on fuel consumption, the emissions from the proposed alternative would be low compared to the emissions from all mobile sources on the Hanford Site. The maximum annual diesel fuel usage for the proposed action is 481,372 L (127,165 gal), ~5% of the total diesel fuel used by all mobile sources on the Hanford Site. The fuel usage for fiscal year (FY) 2010 and FY2011 for mobile sources on the Hanford Site is 9,562,730 L (2,526,206 gal) and 12,622,467 L (3,334,503 gal), respectively (CCN 170060).

Table 5-2. Maximum Annual Criteria and Toxic Air Pollutant Emissions (tons/year).

Criteria Pollutants						Toxic Air Pollutants			
NO _x	CO	ROG	SO _x	PM ₁₀	PM _{2.5}	Benzene	Formaldehyde	Acetaldehyde	1,3 Butadiene
Proposed Action Alternative									
15.76 [14.31]	3.70 [3.36]	0.79 [0.72]	0.02 [0.18]	37.0 [33.6]	4.30 [3.90]	0.009 [0.008]	0.023 [0.021]	0.006 [0.005]	0.011 [0.010]
No-Action Alternative									
28.33 [25.72]	6.98 [6.34]	1.52 [1.38]	0.03 [0.027]	82.0 [74.4]	9.25 [8.40]	0.017 [0.015]	0.044 [0.040]	0.012 [0.011]	0.021 [0.019]

5.1.2.3 Dust Emissions from Borrow Pit Operation. Emissions of dust (PM) would occur during excavation and loading of borrow pit materials and during transportation on unpaved roads. Water would be used to control dust during excavating, loading, unloading, and transporting. Exhaust emissions of PM would also be generated from the operation of the haul trucks and the excavators. The U.S. Environmental Protection Agency (EPA) has established standards for PM under the National Ambient Air Quality Standards (NAAQS). The EPA has established a 24-hour standard for PM₁₀, and 24-hour and annual standards for PM_{2.5}. Three borrow pits (Pit 6, Pit 24, and Pit 36) were evaluated to estimate the potential impacts from PM₁₀ and PM_{2.5} from the Proposed Action Alternative. These three pits were deemed to represent reasonable worst-case scenarios based on material throughput, truck traffic on the borrow pit site, and new unpaved roads, and distance to potential public receptors.

Air dispersion modeling via a screening-level analysis was conducted to demonstrate the projected PM emissions (Appendix B). The results of the modeling are presented in Table 5-3 along with the NAAQS.

Table 5-3. Maximum Predicted Total Impacts Compared to NAAQS.

Site/ Contaminant	Averaging Time	Predicted Maximum Project Impact ($\mu\text{g}/\text{m}^3$)	Average Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Total Predicted Maximum Impact (Project + Ambient) ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)
Pit 6					
PM ₁₀ ^a	24-hour	21.7	18 ^b	39.7	150
PM _{2.5}	24-hour	2.5	4.5	7.0	35
PM _{2.5}	Annual	0.054	4.5	4.6	15
Pit 24					
PM ₁₀ ^a	24-hour	30.2	18	48.2	150
PM _{2.5}	24-hour	4.7	4.5	9.2	35
PM _{2.5}	Annual	.0009	4.5	4.5	15
Pit 36					
PM ₁₀ ^a	24-hour	36.6	18	54.6	150
PM _{2.5}	24-hour	4.1	4.5	8.6	35
PM _{2.5}	Annual	0.01	4.5	4.5	15

^a In 2006, EPA revoked the annual standard for PM₁₀ because available evidence did not suggest a link between long-term PM₁₀ exposure and health problems. However, WAC 173-470-100, “Ambient Air Quality Standards for Particulate Matter,” maintains an annual standard for PM₁₀ that is the same as the revoked federal standard, 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), annual arithmetic mean. Due to a variety of factors (including results of the 24-hour modeling analysis for PM₁₀ and annual PM_{2.5}, limited number of days of operation per year, and the factor to convert maximum hourly to annual concentration for a volume source [0.03 versus 0.15 for a 24-hour]), it is concluded that the annual predicted concentration of PM₁₀ would be well below the state standard of 50 $\mu\text{g}/\text{m}^3$ and modeling this scenario would not be necessary.

^b The ambient PM₁₀ concentration (18 $\mu\text{g}/\text{m}^3$) is based on the annual average measured at the Benton Clean Air Authority monitoring station in Kennewick, Washington, in 2006 (the observed annual average PM₁₀ concentration at the HMS was 13 $\mu\text{g}/\text{m}^3$, but this was only based on 149 days of observations). The annual average PM_{2.5} concentration at the HMS during 2006 was 4.5 $\mu\text{g}/\text{m}^3$ (PNNL-6415).

EPA = U.S. Environmental Protection Agency
HMS = Hanford Meteorological Station
NAAQS= National Ambient Air Quality Standards
PM = particulate matter
WAC = *Washington Administrative Code*

The results show that at a hypothetical maximum impact point (Columbia River for the 24-hour standard and Hanford Site boundary for the annual standard) potential maximum PM impacts in any given year would be below the NAAQS. As noted previously, since the proposed expansion of borrow pits would result in continuation of an existing ongoing practice of removal and use of borrow pit material, no substantial increase in overall air emissions would be envisioned to result from the Proposed Action Alternative.

5.1.3 Water Quality

The Proposed Action Alternative is not anticipated to adversely impact the groundwater or the Columbia River. Construction and operation activities at the borrow locations may include the use of water sprays for dust control. The source of water used for dust suppression is the existing Hanford Site water systems that are used for raw water supplies and drinking water and that are authorized for discharge to the ground in existing State Waste Discharge Permits issued by the Washington State Department of Ecology (Ecology) pursuant to WAC 173-216, "State Waste Discharge Permit Program." To reduce infiltration of dust suppression water to groundwater, the volume of water applied to the land surface is visually monitored to minimize ponding at the borrow area locations evaluated in this EA. The Proposed Action identifies that in the unlikely event that groundwater is encountered in the bottom of a borrow pit, administrative controls would be used, such as markers or temporary fencing to prevent contact between groundwater and equipment. If groundwater was to remain for a sustained period, material would be placed in those areas to ensure they would not remain wetted.

Additional water would be used in Pit 30 to process the borrow material to obtain the appropriate sized material to meet construction needs at ERDF and the Waste Treatment Plant (WTP). However, the discharges at Pit 30 are not anticipated to impact the groundwater or Columbia River. Pit 30 is located in the 200 Area of the Hanford Site and the distance to groundwater is at least 100 m (330 ft) below the ground surface and the Columbia River is several miles away. In addition, requirements from state-wide *Sand and Gravel General Permit* (Ecology 2011), issued by Ecology, would be implemented. The permit sets discharge effluent limits to ensure that the water quality standards of the state are met and requires effluent monitoring. To minimize the impacts to waters of the state (i.e., groundwater and Columbia River), best management practices, spill controls, frequent inspections, and waste disposal requirements are required by the permit to be implemented to control discharges and minimize the presence of pollutants (e.g., oils).

5.1.4 Land Use

The borrow pits proposed for expansion under the proposed action are located within "Industrial," "Conservation," "Low-intensity Recreation," or "Preservation" areas designated in the HCP-EIS. The pits included in this EA are approved for use in support of DOE missions for site cleanup and are considered pre-existing, nonconforming land-uses as described in the HCP-EIS. The pre-existing, nonconforming land-uses allows for continuation of land uses that were established prior to HCP-EIS land-use designation, such as remediation activities. All or portions of borrow pits F, H, N, and 24 lie within 0.4 km (0.25 mi) of the Columbia River, an area known as the Hanford Reach National Monument. Consistent with DOE's authority to manage lands within the Monument as necessary to carry out the environmental cleanup mission, use of the proposed borrow sites would be allowable under the June 9, 2000, Presidential Proclamation.

5.1.5 Ecological Resources

To ensure that disturbance of ecological resources is minimized under the Proposed Action, borrow material would be excavated on an as-needed basis, and only the area needed for material would be disturbed. Consequently, of the 76 ha (187.4 ac) evaluated for disturbance under the Proposed Action, there is a possibility that not all of this area would be consumed for the purposes of obtaining borrow material. Under the Proposed Action, and as discussed in Section 4.2 of this EA, impacts to plant or animals species under the proposed action for Pits F, N, 6, 9, 18, 23, 24, 34, and 36 would be minor. In accordance with the BRMaP, mitigation for potential impacts to ecological resources would be expected at 3 of the 12 pits: Pits H, 21, and 30.

For example, the Proposed Action location at H Pit consists of poor habitat overall, although an occurrence of Piper's daisy, a BRMaP Level III resource, has been reported. However, the existence of Piper's Daisy is presently unknown at this particular location. An evaluation for the presence of this species would be conducted prior to expansion. If present and impacted by expansion, mitigation would be conducted in accordance with applicable Hanford Site management plans and the MAP for this EA.

Along with several native plant species, several species of wildlife were observed in the expansion area for Pits 21 and 30 under the proposed alternative. Impacts to ecological resources, including mature shrub habitat and sage-obligate species would be expected as a consequence of expanding Pits 21 and 30. The Pit 21 expansion lies within a historical sagebrush belt. This sagebrush belt experienced high mortality during the late 1990's and subsequently was burned in a wild-land fire. There is a 1.1-ha (2.79-ac) island of Level III habitat that would be impacted. This island shows signs of extreme stress and the area is not supporting any recruitment. BRMaP calls for compensatory mitigation to be implemented in the revegetation window immediately following disturbance. Compensatory mitigation for this 1.1-ha (2.79-ac) island on a 3:1 basis would likely greatly aid in re-establishing the sagebrush belt. Mitigation would be conducted in accordance with current Hanford Site management plans and the MAP for this EA.

Although Pit 30 would require compensatory mitigation for a maximum of the 7.7 ha (19 ac) expansion, best land use practice would be to keep the expansion adjacent to the previously disturbed areas rather than to create broken habitat. Where fine-grained materials would be stockpiled in Pit 30, care would be taken to ensure that if swallow nests are in these stockpiles, those active swallow nests and their eggs would be protected in accordance with the *Migratory Bird Treaty Act of 1918*. The existence of Piper's Daisy is presently unknown at this particular location, so monitoring would be conducted. Compensatory mitigation would occur in the first available revegetation window, thus creating a Level III sagebrush habitat in an area three times the size of the borrow pit expansion, that otherwise would not have been restored, and the expansion area itself would be revegetated upon closure. Mitigation would be conducted in accordance with Hanford Site management plans and the MAP for this EA.

The eastern (inactive) portion of Pit 24 includes a wetted area that supports growth of vegetation requiring a damp environment, including invasive species. There would be no borrow material obtained from the inactive wetted portion of this pit under the Proposed Action.

Despite several native species noted at Pit 6, their presence is non-contiguous with few individuals. Given these attributes, the expansion area under the Proposed Action is not considered habitat of high quality and thus BRMaP does not require mitigation. The Proposed Action Pit 23 expansion area also supports few native species of maturity. The overall low quality and non-contiguous habitat does not require any mitigation per BRMap. Closure activities would likely enhance the borrow area sites.

The 76 ha (187.4 ac) that would be affected by the Proposed Action comprises approximately 0.1 percent of the total area designated as “Preservation” in the HCP-EIS. Of the total area proposed for disturbance under the Proposed Action, using BRMaP criteria only 11% is identified as high quality habitat requiring mitigation. As a consequence of the proposed mitigation; approximately 26 ha (65 ac) of currently low quality habitat would be revegetated to a Level III condition under the Proposed Action Alternative. Revegetation to replace impacted native species displaced by expansion under the proposed action would be conducted in accordance with applicable Hanford Site management plans.

No disturbance to bald eagles would result under the proposed action because the proposed borrow areas are not located in proximity to eagle roosting/nesting areas. Table 5-4 lists the ecological resources reviews for the borrow pits that would be affected under the proposed action alternative.

**Table 5-4. Ecological Resources Reviews for
Borrow Areas.**

Pit Location	Ecological Resource Review Number
100-F	06-ER-037b
100-H	11-ER-025c
100-N	07-ER-019e
Pit 6	10-ER-007c
	10-ER-007d
Pit 9	12-ER-010a
Pit 18	06-ER-012
Pit 21	12-ER-016
Pit 23	12-ER-003c
Pit 24	11-ER-015
Pit 30	08-ER-003b
Pit 34	ECR-2011-200-052
Pit 36	12-ER-018

If at any point groundwater is encountered, administrative controls would be implemented so as not to allow any equipment to come into contact with the water. This may include controls such as ropes, barriers, stanchions with signage, etc. If groundwater was to remain for a sustained period, material would be placed in those areas to ensure they would not remain wetted.

5.1.6 Cultural Resources

In accordance with NHPA Section 106, potential effects to historic properties that would result from the proposed action were evaluated. As discussed in Section 4.2 of this EA, direct adverse impacts to historic properties and cultural resources would not be expected for Pits F, H, and N, and for Pits, 6, 9, 18, 21, 23, 24, 30, 34, and 36. However, indirect impacts to views from the *Mooli Mooli* and Gable Mountain TCPs are anticipated from the proposed actions at Pits N, 21, 23, and 36.

Indirect impacts to views from the *Mooli Mooli* and Gable Mountain TCPs would be mitigated by shaping the borrow pits to the natural land contours, recontouring, and revegetating with native plant species upon borrow pit closure in accordance with the proposed action in Section 3.1 of this EA. Additionally, Pits 21, 23, 36, and N would be bermed along pit boundaries to minimize impacts to views from the *Mooli Mooli* and Gable Mountain TCPs during use of the pit. Mitigation measures are described in the MAP for this EA.

Table 5-5 lists the cultural resources reviews for the borrow pits that would be affected under the proposed action alternative.

Table 5-5. Cultural Resources Reviews for Borrow Areas. (2 Pages)

Pit Location	Cultural Resource Review Number	Results and Stipulations
100-F ^a	HCRC#2003-100-001 (CCN 103599)	No Historic Properties Affected.
100-H	HCRC#2012-100-025	No Historic Properties Affected.
100-N	NPCE#2011-100-011	No Potential to Cause Effect.
Pit 6	HCRC#2012-600-004	No Historic Properties Affected.
	HCRC#2012-600-032	No Historic Properties Affected.
	HCRC#2012-600-037	No Historic Properties Affected.
Pit 9	HCRC#2012-300-010	No Historic Properties Affected.
Pit 18 ^b	NPCE#2006-600-010	No Potential to Cause Effect.
Pit 21	HCRC#2012-100-023	No Historic Properties Affected.
Pit 23	HCRC#2012-600-034	No Historic Properties Affected.

Table 5-5. Cultural Resources Reviews for Borrow Areas. (2 Pages)

Pit Location	Cultural Resource Review Number	Results and Stipulations
Pit 24	HCRC#2011-100-057 HCRC#98-600-005 HCRC#98-600-005a	No Adverse Effect to Historic Properties –With Stipulations. Adverse Effect to Historic Properties. The Washington State Department of Archaeology and Historic Preservation signed MOA dated August 24, 1998 (Griffith 1998); the Advisory Council on Historic Preservation signed an MOA on September 30, 1998 (Crisler 1998).
Pit 30	NPCE#2008-600-014	No Historic Properties Affected.
Pit 34	HCRC#2011-200-052	No Historic Properties Affected.
Pit 36	HCRC#2012-100-024	No Adverse Effect to Historic Properties – With Stipulations. ^c

^a The cultural resource review conducted for Pit F in 2002 addressed the total disturbed area in Table 3-1.

^b The cultural resource review conducted for Pit 18 in 2006 addressed the total disturbed area in Table 3-1.

^c Consulting parties raised concerns regarding potential effects to the *Mooli Mooli* TCP during the NHPA Section 106 30-day review period and during the EA comment period. Consequently, DOE continues to consult on Pit 36.

DOE = U.S. Department of Energy

EA = environmental assessment

HCRC = Hanford Cultural Resources Case

MOA = Memorandum of Agreement

NHPA = *National Historic Preservation Act*

NPCE = No Potential to Cause Effects

5.1.7 Visual Resources

An evaluation of potential impacts to visual resources from the proposed action was performed. The study area for visual resources includes the existing borrow areas proposed for expansion, the proposed new borrow area, and surrounding lands from which the borrow areas could be seen. Seven different “viewpoints” were used to conduct the evaluation including Gable Mountain, the White Bluffs Overlook, The White Bluffs Boat Launch, inside the *Mooli Mooli* hills near the 100-N Area, 105-B Reactor, the Bruggeman Warehouse, and the Umtanum Ridge Overlook. These viewpoints were selected to represent key locations from which Hanford Site areas affected by the proposed action could be observed. A general description of the visual resources in the proposed action area is provided in this section along with photographs from each viewpoint evaluated.

The visual setting of the Hanford Site consists of expansive views of low-relief grass and shrub-steppe over the relatively level plateau of the Pasco Basin. These views are complemented by high-relief geologic features, including Umtanum and Yakima ridges to the west, Rattlesnake Mountain to the south, and the Columbia River and associated White Bluffs formation to the north. Gable Butte and Gable Mountain are prominent features within the otherwise level plateau study area. Development within the Hanford Site is primarily widely spaced industrial areas, including historic reactors located along the Columbia River and two designated industrial

zones: the Central Plateau (also called the 200 Area) and the South 600 Area, located in the southeast portion of the Hanford Site. The Energy Northwest Columbia Generating Station nuclear power plant is located in the South 600 Area and its cooling towers and steam plumes can be seen from miles away. The Energy Northwest nuclear reactors and DOE facilities of the Central Plateau are brightly lit at night and are highly visible from many areas.

Transmission lines and structures are also a major visual component of the Hanford Site, with several 500-kV and 230-kV lines with steel-lattice towers and 115-kV lines with H-framed wood structures. Other built components that comprise the visual landscape at the Hanford Site include State Route 24 and State Route 240. The built features, while clearly evident, do not dominate the landscape and, within the context of the Hanford Site as a historic nuclear facility, would be considered an integral part of the Hanford landscape. Based on criteria developed by the U.S. Bureau of Land Management to rate scenic quality (BLM 1986), overall scenic values of the Hanford Site are high because the area contains the following:

- High vertical geographic features (such Gable Butte, Gable Mountain, and Rattlesnake Mountain) set against expansive open space.
- The Hanford Reach of the Columbia River, located within the Hanford Reach National Monument, is eligible, but not currently proposed, for designation as a Wild and Scenic River (USFWS 2008).
- Historic cultural features, including the “B Reactor,” are located approximately 2.4 km (1.5 mi) south of Pit 24. The B Reactor is a National Historic Landmark that is also being proposed for designation as part of the Manhattan Project *National Historical Park* (NPS 2010).

Viewer groups within the study area include American Indians, public viewers from area highways, recreational viewers from the Columbia River Unit of the Hanford Reach National Monument, and Hanford Site workers and visitors. The majority of the study area is closed to public access and, therefore, has relatively few public viewers. American Indians have access to portions of the Hanford Site that have cultural significance and American Indians are the primary viewers using the Gable Butte, Gable Mountain, and *Mooli Mooli* areas for traditional cultural uses. American Indians and recreational viewers from the Columbia River and adjacent bluffs are the viewer groups most sensitive to visual change.

Figures 5-1 through 5-20 are viewpoints selected as representative views for the visual quality analysis for this EA. Viewer groups likely to use each viewpoint are indicated for each figure; however, exact viewing locations used by tribal users may be culturally sensitive and therefore they are not precisely identified in this public document.

**Figure 5-1. Gable Mountain: Eastern Summit of Gable Mountain, Looking Southwest
Toward Borrow Pits 30 and 34 (Primarily American Indian Viewers).**



**Figure 5-2. Gable Mountain: Eastern Summit of Gable Mountain Southeast Toward
Borrow Pits 6 and 9 (Primarily American Indian Viewers).**



Figure 5-3. Gable Mountain: Top of Gable Mountain, Looking South Toward Borrow Pits 30 and 34 (Primarily American Indian Viewers).



Figure 5-4. Gable Mountain: Top of Gable Mountain, Looking Northwest Toward Proposed Borrow Pit 36 (Primarily American Indian Viewers).



Figure 5-5. Gable Mountain: Top of Gable Mountain, Looking North Toward Proposed Borrow Pit 23 and the 100-N Borrow Pit (Primarily American Indian Viewers).



Figure 5-6. Gable Mountain: Top of Gable Mountain, Looking North Toward Borrow Pit 21 (Primarily American Indian Viewers).



Figure 5-7. Gable Mountain: Top of Gable Mountain, Looking North Toward the 100-H Borrow Pit (Primarily American Indian Viewers).



Figure 5-8. Gable Mountain: Top of Gable Mountain, Looking East Toward the 100-F Borrow Pit and Borrow Pit 18 (Primarily American Indian Viewers).



**Figure 5-9. Gable Mountain: Top of Gable Mountain, Looking West
Toward the Borrow Pit 24 (Primarily American Indian Viewers).**



**Figure 5-10. White Bluffs Overlook: White Bluffs Interpretive Overlook, Looking
Southwest Toward the Borrow Pits 6, 9, 30, and 34 (Primarily Recreational Viewers).**



Figure 5-11. White Bluffs Overlook: White Bluffs Interpretive Overlook, Looking Northwest Toward the Borrow Pits 21, 23, 24, 36, and the 100-F, 100-H, and 100-N Borrow Pits (Primarily Recreational Viewers).



Figure 5-12. White Bluffs Boat Launch: White Bluffs Launch (east bank), Looking Southwest Toward the Borrow Pits 6, 9, 30 and 34 (Primarily Recreational Viewers).



Figure 5-13. White Bluffs Boat Launch: White Bluffs Boat Launch (east bank), Looking Northwest Toward the Borrow Pits 21, 23, 24, 36 and the 100-F, 100-H, and 100-N Borrow Pits (Primarily Recreational Viewers).



Figure 5-14. Rt 4 North Inside *Mooli Mooli*: Looking East Toward the 100-F and 100-H Borrow Pits (Primarily American Indian Viewers).



**Figure 5-15. Rt 4 North Inside *Mooli Mooli*: Looking North Toward
Borrow Pit 21 (Primarily American Indian Viewers).**



**Figure 5-16. Rt 4 North Inside *Mooli Mooli*: Looking West Toward Proposed
Borrow Pit 36 (Primarily American Indian Viewers).**



Figure 5-17. Rt 4 North Inside *Mooli Mooli*: Looking Northwest Toward the 100-N Borrow Pit (Primarily American Indian Viewers).



Figure 5-18. B Reactor: Looking West Toward the Borrow Pit 24 (Primarily Recreational Viewers).



**Figure 5-19. Bruggeman’s Warehouse: Looking East, Overview
of Hanford Site (Primary Recreational Viewers).**



**Figure 5-20. State Route 24 Umtanum Ridge Overlook: Umtanum Ridge Overlook
Looking East, Overview of Hanford Site (Primarily Recreational Viewers).**



The construction and operation of borrow sites and associated CERCLA remedial action area haul roads under the proposed action would minimize additional impacts to aesthetic and visual resources to the extent practical, since most borrow sites would be located away from high traffic areas and would not be visible to the general visiting population. Additionally, these areas would be revegetated to blend in with the surrounding terrain. Proposed borrow locations F, 6, 9, 18, 24, 30, and 34 are not visible from the Columbia River or TCPs defined by American Indians. Pits 21, 36, and the N borrow pit are visible from the TCP known as the *Mooli Mooli*. Pit 23 is visible from the TCP known as Gable Mountain. To mitigate impacts to views from the *Mooli Mooli* and Gable Mountain TCPs, the borrow pits would be bermed around the outside edges to minimize the visual impact and recontoured and revegetated upon closure of the borrow pits. In addition, these pit expansions would be shaped to blend with natural land contours as much as possible during development and use. Mitigation measures are described in the MAP for this EA.

5.1.8 Transportation

Potential impacts of incident-free, intra-site truck transport of borrow materials have been considered. Typically, incident-free impacts are based on consideration of traffic congestion and pollutants emitted from the vehicles during normal transportation. Occasional interference with the local traffic flow would be mitigated by appropriate administrative controls (e.g., warning signs and traffic markers). The exclusive haul roads used for the proposed action would continue to minimize interference with normal traffic flows because most would not use or intersect any primary Hanford Site routes. Where use of primary Hanford Site routes would be likely for transport of borrow material (e.g., use of Pit 23), availability of a number of other borrow sources close to project areas would minimize the impact to primary-route traffic.

Types of pollutants that could be present and might impact the public include SO_x, particulates, NO_x, CO, hydrocarbons, and photochemical oxidants.

The shorter driving distances afforded under the proposed action would minimize emissions from transport of borrow material. Section 5.1.2 discusses emissions under the Proposed Action in detail. Section 5.2 provides detail on emissions under the No-Action Alternative. Because the Proposed Action would allow continuation of the current practice of borrow material transport, vehicle and fugitive dust emissions resulting from the proposed action would not be anticipated to substantially impact the existing air quality on the Hanford Site. Pollution prevention policies and procedures have been established for the Hanford Site. Administrative controls such as vehicle maintenance and the use of ultra-low sulfur fuels would also minimize potential impacts. In addition, dust-control measures such as the use of water sprays would be used on the unpaved portion of the haul roads to minimize particulate air emissions during transportation of borrow materials.

5.1.9 Reasonably Foreseeable Accidents Considered and the Potential Effects

The reasonably foreseeable accidents under the proposed action for excavation and use of borrow areas and construction of haul roads within the CERCLA remedial action areas would be

typical construction and transportation accidents. Public health and safety would not be affected because most of the proposed action area is closed to the general public, and use of Pits 6 and 9 (which would be accessed using a public highway) is a continuation of an ongoing activity. Typical construction hazards would exist; however, the risk of severe accidents would be low because haul roads would be restricted to operational use only. The risk of accidents would be reduced under the proposed action by making borrow source material available closer to project areas.

5.1.10 Socioeconomics and Environmental Justice

Activities on the Hanford Site have played a substantial role in the socioeconomics of the Tri-Cities. DOE and its contractors operating and cleaning up the Hanford Site, Energy Northwest (Columbia Energy Generating Station), and the agricultural community comprise the major economic sectors of the Tri-Cities. In addition, tourism, technology-based businesses, and non-DOE contractors also contribute to the region's economy.

The area within an 80-km (50-mi) radius of the Hanford Site encompasses parts of 10 counties in two states: Adams, Benton, Franklin, Grant, Kittitas, Klickitat, Walla Walla, and Yakima Counties in Washington; and Morrow and Umatilla Counties in Oregon. Based on the 2010 census, the total population of these counties was 811,495, of which the total minority population was 215,445 or about 27%. Minority persons are those who identify themselves as Hispanic or Latino, Asian, Black or African American, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or multiracial (with at least one race designated as a minority race under the Council on Environmental Quality guidelines).

The ethnic composition of the 10 counties is roughly 73.5% White, 1.1% Black or African American, 2.3% American Indian or Alaska Native, 1.5% Asian or Pacific Islander, 0.1% Native Hawaiian/Pacific Islander, 18.1% some other race, and 3.4% two or more races. Hispanics and Latinos account for 32.8% of the total population and roughly 80% of the total minority population in the 10 counties. Approximately 80% of the minority population resides in Franklin, Benton, Yakima, and Grant Counties. American Indians reside primarily on the Yakama Reservation and upstream of the Hanford Site near the town of Beverly, Washington. Low-income persons constitute approximately 16% of the total population in the 10 counties surrounding the Hanford Site.

Approximately 90% of DOE contractor employees working on the Hanford Site live in Benton and Franklin Counties. Of these employees, approximately 73% reside in Richland, Pasco, or Kennewick (roughly 37% in Richland, 11% in Pasco, and 25% in Kennewick). Residents of other areas of Benton and Franklin Counties (including West Richland, Benton City, and Prosser) account for the remaining 17% of total DOE contractor employment (PNNL-6415). An estimated 175,177 people lived in Benton County and 78,163 lived in Franklin County during 2010, totaling 253,340, an increase of roughly 32% from the 2000 Census. This growth rate is faster than the state of Washington, which has grown 14.1% since the 2000 Census. During 2010, Benton and Franklin Counties accounted for 3.8% of Washington's population. The population demographics of Benton and Franklin Counties are similar to those found within Washington State.

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

Environmental Justice under Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629), is concerned with assessing the extent to which there may be a disproportionate and adverse impact from a proposed action among minority and low-income populations in which the impacts are notable compared to those experienced by the rest of the population. Adverse impacts are defined as negative changes to the existing conditions in the natural environment (e.g., land, air, water, wildlife, vegetation) or in the human environment (e.g., employment, health, land use).

For purposes of this analysis, it was estimated that about 250,000 labor hours would be required to complete the proposed action. Since the proposed action is a continuation of project activities underway, the work is expected to be accomplished using a workforce similar to what is currently in place. Expansion and use of the borrow pits in the proposed action would be performed by a combination of onsite labor and offsite vendors. The existing borrow areas occupy a total of approximately 209 ha (517 ac) within the Hanford Site, and the proposed action would increase that total to 285 ha (704 ac [1.2 mi²]). The Hanford Site is 1,524 km² (586 mi²). While several Native American tribes have cultural and religious ties to the Hanford Site, the proposed action includes mitigations to potential impacts to sensitive cultural resources. Consequently, it is not expected that the proposed action would have the potential to cause disproportionately high and adverse impacts on minority, low income, or Native American Tribal populations in the vicinity of the Hanford Site.

A greater number of labor hours would be expected with the No-Action Alternative, given the longer haul distances to fill the need for borrow material. However, because the use of borrow pits to support Hanford Site activities is an ongoing operation, socioeconomic impacts from the No-Action Alternative are not anticipated. In addition, impacts to cultural resources identified in the Proposed Action Alternative would be mitigated.

5.1.11 Noise Impacts

The activities associated with the use of borrow pits have the potential to generate noise at levels above typical background noise levels. Because borrow pits would not be accessed by the general public, the operation of borrow pits would occur beyond the applicable “region of influence” for members of the public. Operation of excavating equipment and passing haul trucks would amount to ambient noise in the vicinity of the borrow pits. Potential noise impacts to workers, such as from vehicle and equipment operation, would be minimized through the use of hearing protection programs aligned with Occupational Safety and Health Standards (29 CFR 1926.52, “Occupational Noise Exposure for the Construction Industry”).

Typical borrow pit use activities under the Proposed Action would be similar to ongoing activities at currently approved borrow pit areas. Consequently, it is not expected that the noise levels under the Proposed Action would be substantially greater than those generated under the No-Action Alternative.

5.1.12 Conclusion of Cumulative Impacts and Environmental Consequences Discussion

The evaluations in this section of the EA were performed in order to give consideration to potential cumulative impacts that would result from the proposed action. Most aspects of potential effects from the proposed action would be temporary, such as effects to transportation, air quality, water quality, health and safety, socioeconomic and environmental justice, and noise.

Land use for borrow pit use under the proposed action is consistent with allowances made by current land-use decisions. For any effects to resources that would not be considered temporary, impacts would be mitigated by measures outlined in the MAP for this EA. This applies to ecological, cultural, and visual resources. Because the proposed action includes measures to avoid and/or minimize potential impacts, compelling cumulative impacts would not be anticipated under the proposed action.

5.2 IMPACTS FROM THE NO-ACTION ALTERNATIVE

Generally, transport of borrow materials from a limited number of pits as allowed under the No-Action Alternative would increase impacts to air quality, transportation resources, and risks as compared to the proposed action alternative. This is a consequence of the greater transport distances required when a smaller number of borrow sources are available for the same number of active remediation and construction project areas.

For example, the increase in distance to obtain borrow source material under the No-Action Alternative would result in greater emissions of greenhouse gases, along with criteria and toxic air pollutants. If the borrow pits are not expanded, additional miles that would be traveled by the haul trucks to obtain borrow materials would result in the consumption of more fuel and an increase in air pollutants. The estimated haul truck distance traveled under the proposed action is 5,062,330 km (3,145,586 mi). The estimated miles for the No-Action Alternative, which would

obtain borrow material from currently approved onsite borrow sources is 10,962,198 km (6,811,594 mi), resulting in 54% more fuel consumption and air emissions than the Proposed Action. Likewise, emissions of greenhouse gasses would be higher under the No-Action Alternative. Additional details comparing the air quality impacts under the Proposed Action and No-Action Alternatives can be found in Section 5.1.2 and Appendix B.

The impacts from the increased distances traveled under the No-Action Alternative would include a higher risk of accidents. An accident rate of 0.76 accidents per 10 million truck miles, and a fatality rate of 0.52 fatalities per 100 million truck miles was used to consider the risks. An increase of 46% from 0.24 accidents under the Proposed Action, to 0.52 accidents under the No-Action Alternative would be anticipated. Likewise, for fatalities, an increase of 46% from 0.016 accidents under the Proposed Action, to 0.035 accidents under the No-Action Alternative would be anticipated (Saricks and Tompkins 1999).

Impacts to transportation resources would be greater under the No-Action Alternative with respect to degradation and repairs needed for roads due to increased use and the consumption of fossil fuels. At least 963,900 additional liters (255,000 additional gallons) of fuel would be consumed under the No-Action Alternative, which is approximately a 49% increase over the estimated fuel consumption under the Proposed Action.

A greater number of labor hours would be expected with the No-Action Alternative, given the longer haul distances to fill the need for borrow material. Under the most likely scenario, as discussed in Section 3.2, an increase of roughly 60 percent in labor hours could be expected. However, because the use of borrow pits to support Hanford Site activities is an ongoing operation, impacts from the No-Action Alternative would not be expected to have socioeconomic impacts on the surrounding populations. In addition, impacts to cultural resources identified in the proposed alternative would be avoided.

6.0 PERMITS AND REGULATORY REQUIREMENTS

6.1 PARTICULATE EMISSIONS

Particulate emissions are regulated by Ecology pursuant to WAC 173-400, "General Regulations for Air Pollution Sources." The general standards for maximum emissions contained in WAC 173-400-040 are applicable to borrow pit activities. These standards require reasonable precautions to be taken to (1) prevent the release of air contaminants associated with fugitive emissions resulting from materials handling, demolition, or other operations; and (2) prevent fugitive dust from becoming airborne from fugitive sources of emissions. Additionally, WAC 173-400-040 requires the use of reasonably available control technology. Dust control measures such as the use of water sprays would be used to control dust during the excavation, loading, and transportation of borrow materials.

6.2 HANFORD REACH NATIONAL MONUMENT

Federal and non-federal entities planning new activities within 0.4 km (0.25 mi) of the Columbia River shoreline of the section of river designated as the Hanford Reach must consult and coordinate with the U.S. Department of Interior in accordance with Section 2(A)(3) of the *Hanford Reach Study Act of 1988*. Portions of the borrow areas proposed for expansion are located within 0.4 km (0.25 mi) of the Columbia River in an area designated as the Hanford Reach National Monument (Pits 24, N, H, and F). Consistent with the DOE's authority to manage lands within the Monument as necessary to carry out the environmental cleanup mission, expansion and use of the proposed borrow sites would be allowable under the June 9, 2000, Presidential Proclamation (65 FR 37253). The U.S. Fish and Wildlife Service (USFWS) administers portions of the monument on behalf of the federal government, assuring protection of the resources identified in the proclamation. While DOE has the authority to use the land for continuation of cleanup actions, DOE coordinated with the USFWS concerning interactions with the Hanford Reach National Monument during preparation of this EA.

6.3 EXCAVATION PERMITS

For the purposes of promoting safe work practices and protecting natural and cultural resources, DOE has established Hanford Site excavation permit requirements and authorizations for working in and around excavations and trenches. Hanford Site excavation permits for the excavation of aggregate materials would be required to prevent unplanned, project-related disturbance or infiltration. Excavation permits would include results of evaluation of impacts to cultural resources and any mitigation actions resulting from this EA, in accordance with NEPA and Section 106 of the NHPA. Excavation permits would also include evaluation results for impacts to natural resources and mitigation actions resulting from this EA in accordance with NEPA and DOE management plans, which incorporate federal natural resource protection laws as well as other relevant and appropriate regulations (BRMaP). The transportation of the borrow materials would comply with the applicable regulations, orders, and guidance promulgated by

Permits and Regulatory Requirements

the DOE, Occupational Safety and Health Administration, and U.S. Department of Transportation, as applicable. These agencies have developed comprehensive regulations covering the performance of shipping, packaging, vehicle safety, routing of shipments, and physical protection.

6.4 MATERIALS PROCESSING AT PIT 30

Pit 30 activities, unlike the operation of the other borrow pits, includes processing of the materials (e.g., crushing and screening) and additional use of water to obtain the appropriate size material for construction of the WTP and ERDF expansion cells. These activities are subject to the Sand and Gravel General Permit issued by Ecology that covers waste water discharges from specific types of facilities throughout Washington State. For those facilities that require coverage under the permit, a permit application for coverage form is submitted to Ecology. In addition, Ecology has issued air emissions requirements in the Hanford Site Air Operating Permit Number 00-05-006, for the operation of the WTP concrete batch plant that includes requirements for WTP associated borrow operations in Pit 30. Borrow operations in Pit 30 that support ERDF cell expansion are not subject to permitting as this work is being conducted under CERCLA; however, the substantive requirements would be met. In accordance with Section 121(e) of CERCLA, no federal, state, or local permits are required for any removal or remedial action carried out under CERCLA authority. Onsite CERCLA actions are, however, required to comply with substantive (but not administrative) requirements of other environmental laws and regulations.

7.0 CONSULTATION AND COORDINATION

The following agencies and organizations were provided advance letters of notification of DOE's intent to prepare this EA:

- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes and Bands of the Yakama Nation
- Nez Perce Tribe
- Wanapum
- U. S. Environmental Protection Agency
- U. S. Fish & Wildlife Service
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Historic Preservation Officer
- Oregon Department of Energy
- Benton County
- Franklin County
- City of Richland
- Hanford Natural Resource Trustee Council
- Hanford Advisory Board
- Heart of America Northwest
- Washington Physicians for Social Responsibility.

Consultation meetings and briefings were held with a number of organizations as requested. Meetings and discussions were held on the following dates:

- July 18, 2012 – All borrow pits and accompanying Cultural Resources Reviews and NEPA document discussed at the monthly issues meeting
- July 30, 2012 – Project walkdown with participating Tribes
- September 19, 2012 – All borrow pits and accompanying Cultural Resources Reviews and NEPA document discussed at the monthly issues meeting
- October 25, 2012 – DOE meeting with the Yakama Nation ERWM
- November 6, 2012 – Field visit to borrow areas with USFWS
- November 15, 2013 – Borrow Area EA document discussed at the Tribal Working Session
- December 14, 2012 – Draft EA document discussed at the Hanford Natural Resources Trustee Council meeting

- March 18, 2013 – Project area visit with Yakama Nation.

During the preparation of this EA, DOE coordinated with USFWS concerning interactions with the Hanford Reach National Monument. A 30-day public comment period on the draft EA was held from December 10, 2012, through January 14, 2013. The final EA is available in the DOE reading room (Consolidated Information Center at Washington State University Tri-Cities), the Richland Public Library, and the Hanford Site website (<http://www.hanford.gov/docs/ea/eal454.html>).

8.0 REFERENCES

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- 50 CFR 402, "Interagency Cooperation - Endangered Species Act of 1973," *Code of Federal Regulations*, as amended.
- 51 FR 41217, 1986, "Final Rule for Regulatory Programs of the Corps of Engineers," *Federal Register*, as amended.
- 53 FR 20765, 1988, "Clean Water Act Section 404 Program Definitions and Permit Exemptions; Section 404 State Program Regulations," *Federal Register*, as amended.
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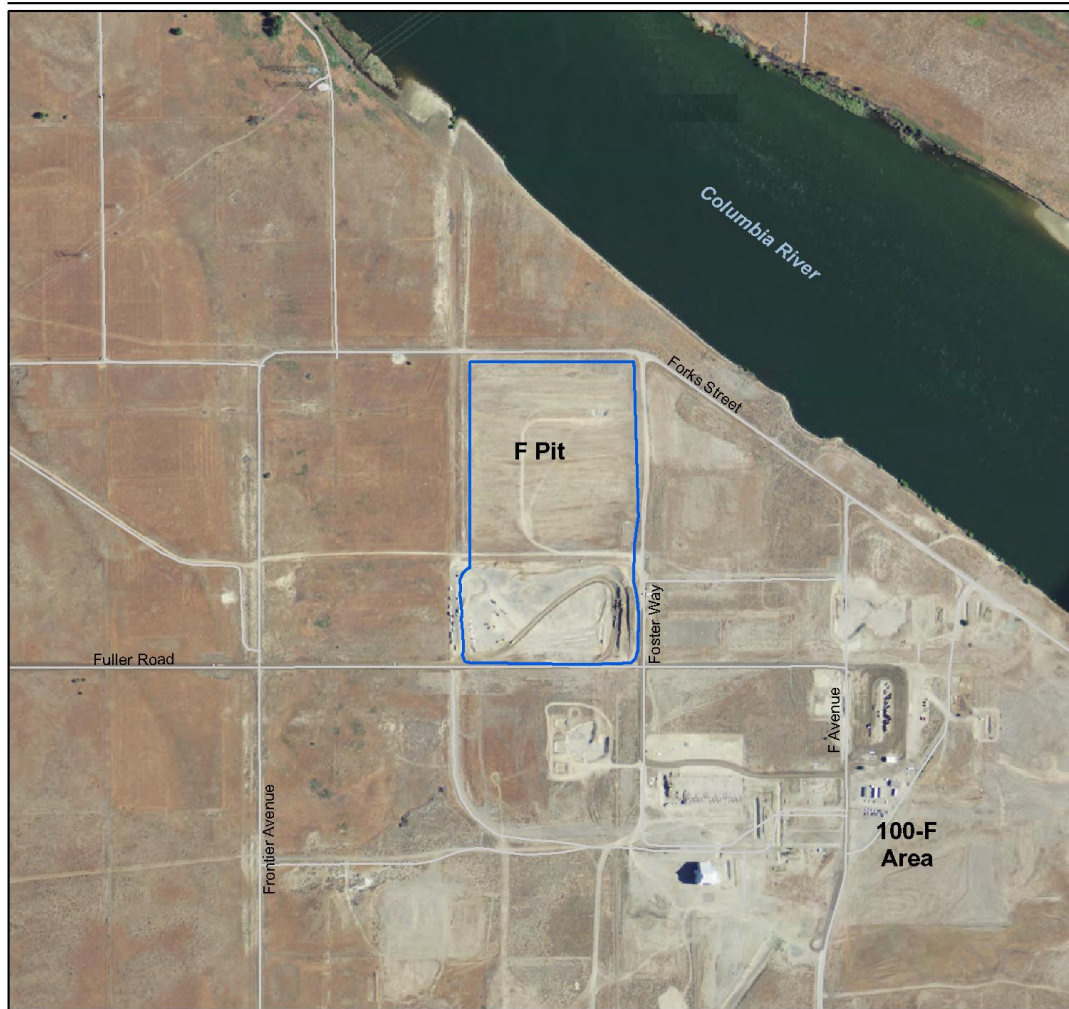
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APPENDIX A

PROPOSED BOUNDARIES OF EXPANDED BORROW PITS

APPENDIX A

PROPOSED BOUNDARIES OF EXPANDED BORROW PITS

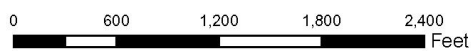


Legend

- F Pit (39.90 acres)
- Roads

Total Disturbed Area: 39.90 acres

NOTES: Aerial Image, 2011, NAIP.



F Pit

Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\FPitExpansion.mxd

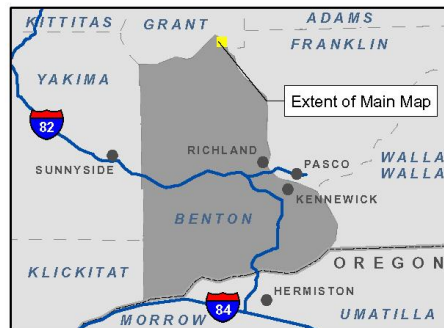
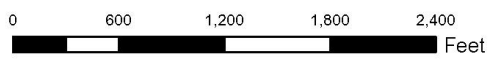


Legend

- H Pit Expansion Area (10.60 acres)
- H Pit (23.70 acres)
- Roads

Total Disturbed Area: 34.30 acres

NOTE: Aerial Image, 2011, NAIP.



H Pit Expansion
H Pit
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\HPitExpansion.mxd

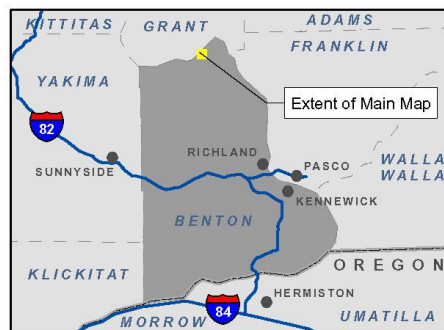
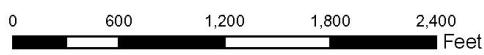


Legend

- N Pit Expansion Area (12.80 acres)
- N Pit (40.20 acres)
- Roads

Total Disturbed Area: 53.00 acres

NOTES: Aerial Image, 2011, NAIP.



N Pit Expansion Area
Pit 23
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\NPitExpansion.mxd

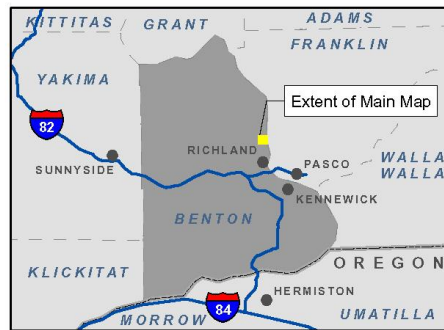


Legend

- Pit 6 Expansion Area (28.00 acres)
- Pit 6 (69.70 acres)
- Roads

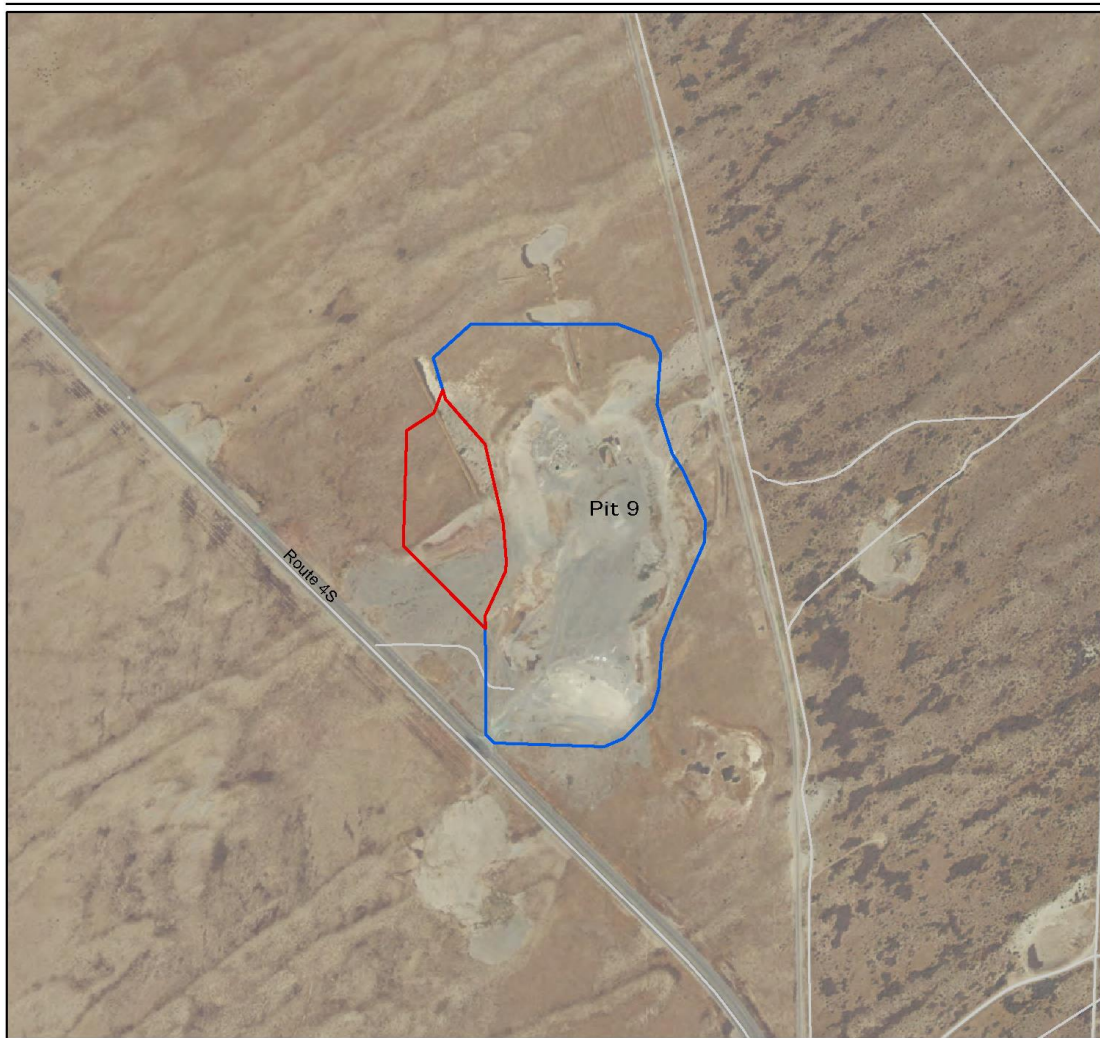
Total Disturbed Area: 97.70 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 6 Expansion Area
Pit 6
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit6Expansion.mxd

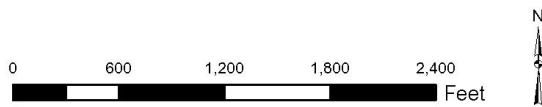


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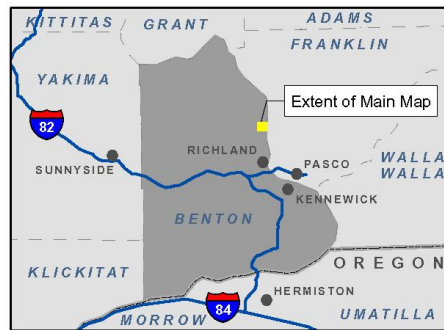
- Pit 9 Expansion Area (11.60 acres)
- Pit 9 (58.70 acres)
- Roads

Total Disturbed Area: 70.30 acres

NOTE: Aerial Image, 2011, NAIP.



Path: C:\Hanford\GIS\MapFiles\WCH\HCRC\2012-300-007_Pit9.mxd



Pit 9 Expansion Area
Pit 9
Hanford Site, Benton County, WA



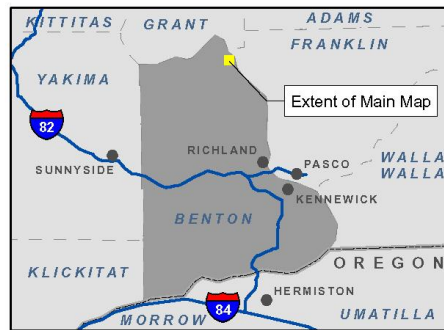
Legend

Pit 18 (8.20 acres)

Roads

Total Disturbed Area: 8.20 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 18

Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\PIT18.mxd

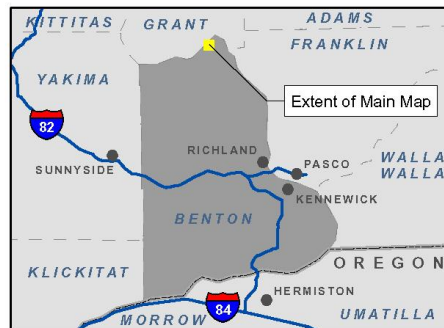
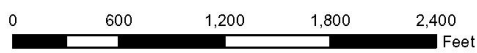


Legend

- Pit 21 Expansion Area (35.00 acres)
- Pit 21 (29.20 acres)
- Roads

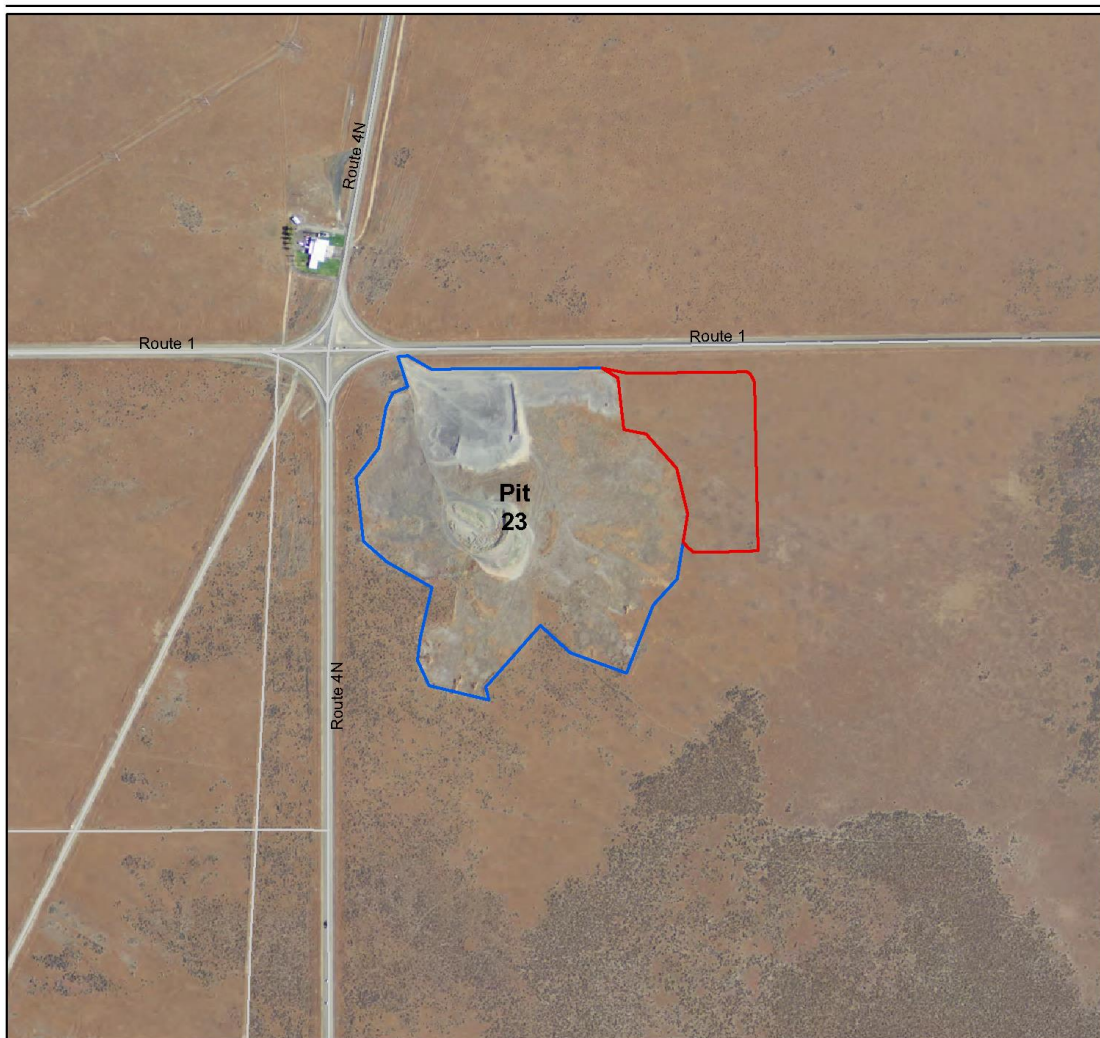
Total Disturbed Area: 64.20 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 21 Expansion Area
Pit 21
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit21Expansion.mxd

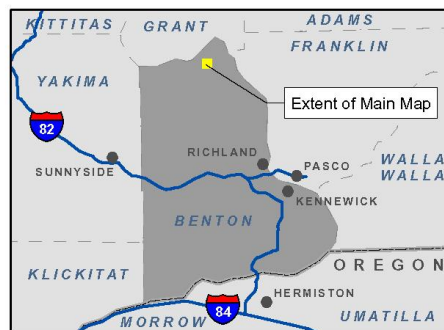
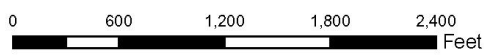


Legend

- Pit 23 Expansion Area (13.00 acres)
- Pit 23 (58.70 acres)
- Roads

Total Disturbed Area: 71.70 acres

NOTES: Aerial Image, 2011, NAIP.



Pit 23 Expansion Area
Pit 23
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit23.mxd

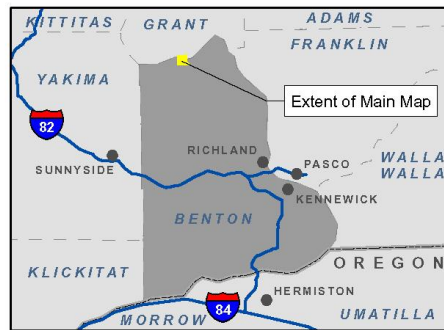
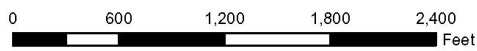


Legend

- Pit 24 Expansion Area (16.50 acres)
- Pit 24 (48.50 acres)
- Roads

Total Disturbed Area: 65.00 acres

NOTES: Aerial Image, 2011, NAIP.



Pit 24 Expansion Area
Pit 24
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit24.mxd

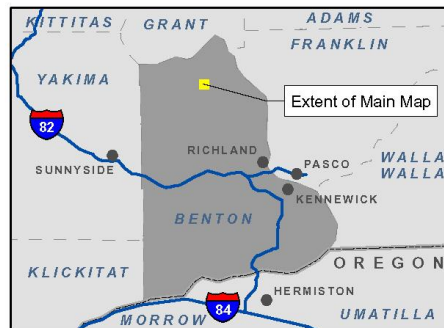
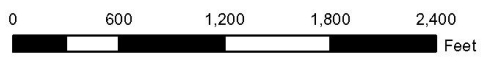


Legend

- Pit 30 Expansion Area (19.00 acres)
- Pit 30 (123.00 acres)
- Roads

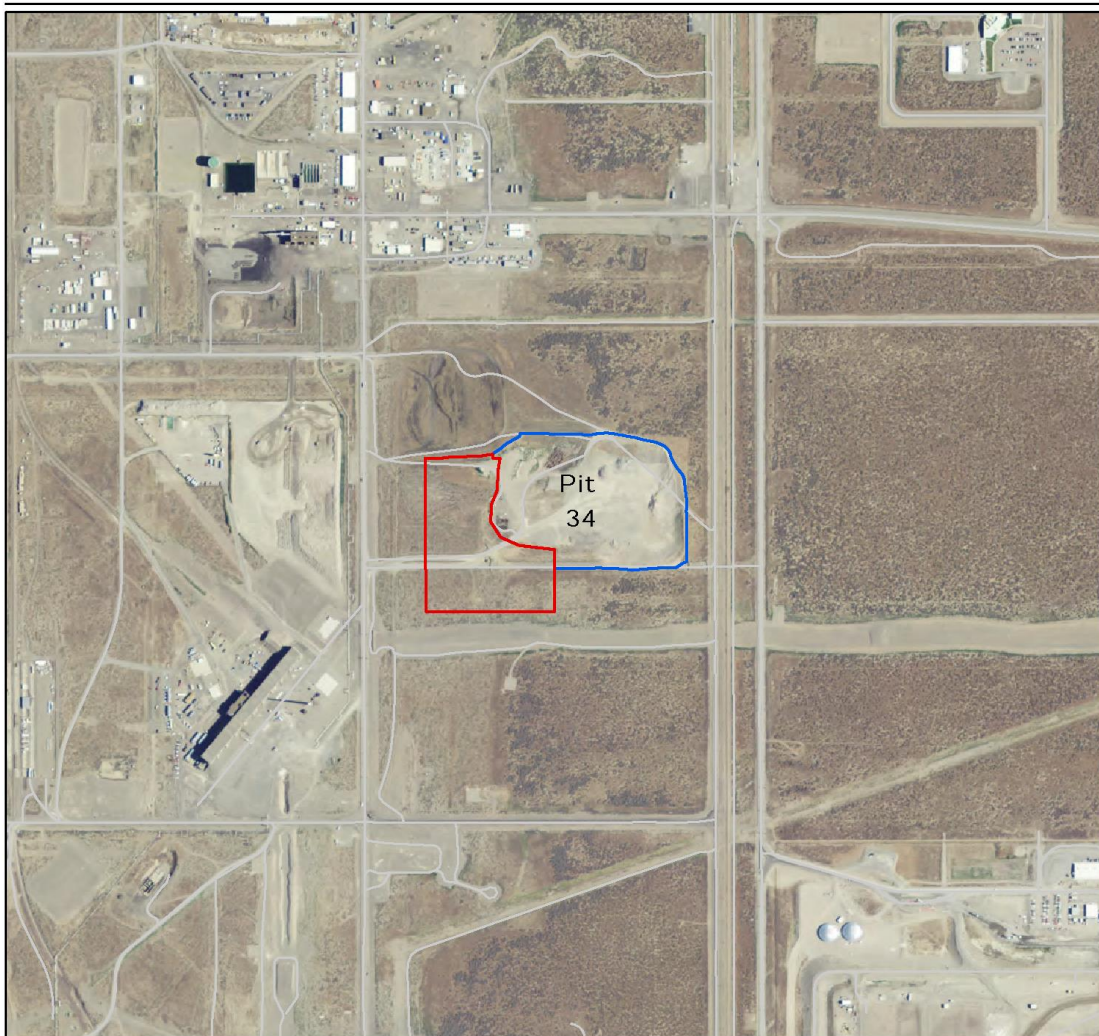
Total Disturbed Area: 142.00 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 30 Expansion Area
Pit 30
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit30.mxd

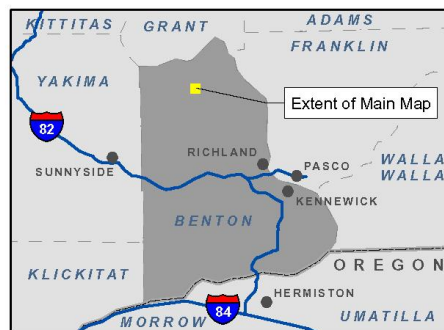
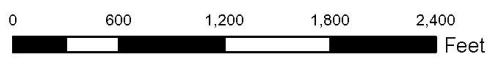


Legend

- Pit 34 Expansion Area (10.90 acres)
- Pit 34 (17.10 acres)
- Roads

Total Disturbed Area: 28.00 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 34 Expansion Area
Pit 34
Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\Pit34.mxd

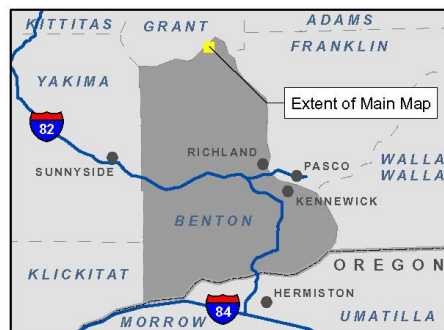


Legend

- Pit 36 (30.00 acres)
- Roads

Total Disturbed Area: 30.00 acres

NOTE: Aerial Image, 2011, NAIP.



Pit 36

Hanford Site, Benton County, WA

Path: C:\Hanford\GIS\MapFiles\WCH\HCR\2012-100-024_N\PitExpansion.mxd

APPENDIX B
EVALUATION OF AIR QUALITY IMPACTS

APPENDIX B

EVALUATION OF AIR QUALITY IMPACTS

During the transfer of material from borrow areas, gaseous and particulate pollutants would be generated at the borrow pits and during transportation of borrow materials. Air quality impacts from implementing the No-Action Alternative or the Proposed Action Alternative would be due principally to exhaust emissions from earth-moving equipment and vehicles (primarily haul trucks), and fugitive dust (particulate matter [PM]) emissions from excavation, loading, and transportation of borrow pit materials. Dust-suppression methods (e.g., application of water spray) would be implemented to control emissions of PM. Since the proposed expansion of borrow pits would result in a continuation of an existing ongoing practice of removal and use of borrow pit material, no increase in overall air emissions would be envisioned to result from the proposed action alternative. The No-Action Alternative emissions are expected to be greater than the Proposed Action Alternative due to the additional vehicle miles traveled between the borrow pits and backfill locations. Under the No-Action Alternative, only a limited number of borrow pits are available and they are located farther from the areas that require borrow pit material for backfill.

The following sections discuss the exhaust and dust emissions from the excavating, loading, and transporting of borrow materials under the Proposed Action Alternative and the No-Action Alternative.

B.1.0 GREENHOUSE GAS EMISSIONS AND CRITERIA AIR POLLUTANT EMISSIONS

Total annual greenhouse gas (GHG) emissions from vehicles and other fuel-burning equipment used to support borrow operations is addressed in Section B.1.1. Total annual criteria air pollutant emissions are addressed in Section B.1.2. The complete calculations that support both sections are contained in the “Annual Air Emissions for Expansion Borrow Pits – Proposed Action and No-Action” (0000X-CA-V0022).

B.1.1 Greenhouse Gas Emissions from Vehicles and Construction Equipment

The primary air emission from vehicles is carbon dioxide, which is considered a GHG. Greenhouse gases are gaseous constituents of the atmosphere, both natural and resulting from, or produced by human beings that absorb and emit thermal infrared radiation (heat) emitted by the Earth’s surface, the atmosphere itself, and clouds. Water vapor, carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and ozone are the primary GHGs in the Earth’s atmosphere. Greenhouse gases trap heat between the Earth’s surface and the lower part of the atmosphere; this phenomenon is called the greenhouse effect.

Appendix B

GHG emissions were calculated from truck exhaust and construction equipment (excavator) exhaust. Truck exhaust emissions were calculated based on truck running and idling emissions, and annual vehicle miles traveled in transporting material. Emission factors (EFs) were based on the California Air Resources Board emissions model for on-road vehicles (CARB 2011) for heavy heavy-duty diesel trucks. Emissions of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) were also calculated. Construction equipment emissions were calculated based on their estimated fuel consumption and EFs from (Appendix D) *Federal Greenhouse Gas Accounting and Reporting Guidance Technical Support Document* (CEQ 2010) for CO₂, CH₄, and N₂O. The CO₂, CH₄, and N₂O emissions were multiplied by their global warming potentials (GWP); 1, 21, and 310, respectively, and all were summed to estimate the total annual GHG as “CO₂ equivalent” (CO₂e).

Estimated maximum annual GHG emissions expected to occur for the Proposed Action and No-Action Alternatives are presented in Table B.1.

Table B.1 Maximum Annual Greenhouse Gas Emissions.

Proposed Action Alternative	No-Action Alternative
1,754 metric tons/year (1,932 tons/year) CO ₂ e	3,170 metric tons/year (3,492 tons/year) CO ₂ e

By way of comparison, the total annual GHG emissions from mobile sources (primarily fleet vehicles) on the Hanford Site in 2011 and 2010 was 43,617 metric tons (48,047 tons) and 33,590 metric tons (37,002 tons) of CO₂e, respectively.

The following describes the methodology for estimating annual GHG emissions from the vehicles and construction equipment used to implement borrow pit operation activities under the proposed action. Emissions under the No-Action Alternative would be greater due to the higher mileage the haul trucks would need to travel to obtain borrow materials.

B.1.1.1 Haul Trucks – Proposed Action Alternative

Maximum annual GHG emissions from the haul trucks under the Proposed Action were calculated based on the following data:

- 1,014,019 km/year (630,217 mi) traveled by the haul trucks from all borrow pits during the maximum year
- 1,727.9 g/vehicle miles traveled (VMT) running EF for CO₂, 0.0051 g/VMT CH₄, 0.0048 g/VMT N₂O
- Apply GWP factors 1, 21, and 310 for CO₂, CH₄, N₂O, respectively

Appendix B

- Idling emissions of CO₂ are 2,395.4 g/truck/day (no data on CH₄ or N₂O during idling, however, as can be concluded from the running EFs, their contribution is insignificant)
- Assuming 8 hours/day, and average speed of 48.3 km/hr (30 mph), the number of truck-operating days during the year is calculated to be 2,625.9

Total GHG emissions from haul trucks due to travel and idling were calculated to be 1,097.0 metric tons (1,208.4 tons) (1,090.7 metric tons (1,201.5 tons) and 6.3 metric tons (6.9 tons) of CO₂e /year for travel and idle, respectively).

B.1.1.2 In-Pit Excavators – Proposed Action Alternative

Maximum annual GHG emissions from the in-pit excavators under the Proposed Action were calculated based on the following data:

- 242,781 L (64,143 gal) of fuel/year (maximum) used by the in-pit excavators
- 10,206.5 g/gal EF for CO₂, 0.414 g/gal CH₄, 0.083 g/gal N₂O
- Apply GWP factors 1, 21, and 310 for CO₂, CH₄, N₂O, respectively

Total GHG emission associated with in-pit excavators was calculated to be 657.3 metric tons (724.1 tons) per year CO₂e.

Total maximum annual GHG emissions from haul trucks and excavators for the Proposed Action Alternative are equal to 1,754 metric tons (1,932 tons) of CO₂e/year (1,097.0 metric tons [1,208.4 tons] CO₂e from haul trucks and 657.3 metric tons [724.1 tons] CO₂e from excavators).

B.1.1.3 Haul Trucks – No-Action Alternative

Maximum annual GHG emissions from the haul trucks under the No-Action Alternative were calculated based on the following data:

- 2,322,799 km/year (1,443,629 mi) traveled by the haul trucks from all borrow pits during the maximum year
- 1,727.9 g/vehicle miles traveled (VMT) running EF for CO₂, 0.0051 g/VMT CH₄, 0.0048 g/VMT N₂O
- Apply GWP factors 1, 21, and 310 for CO₂, CH₄, N₂O, respectively
- Idling emissions of CO₂ are 2,395.4 g/truck/day (no data on CH₄ or N₂O during idling, however, as can be concluded from the running EFs, their contribution is insignificant)

Appendix B

- Assuming 8 hours/day, and average speed of 48.3 km/hr (30 mph), the number of truck-operating days during the year is calculated to be 6,015.1

Total GHG emissions from haul trucks due to travel and idling were calculated to be 2,512.8 metric tons (2,768.0 tons) of CO_{2e} /year (2,498.4 metric tons [2,752.1 tons] and 14.4 metric tons [15.9 tons] CO_{2e} /year for travel and idle, respectively).

B.1.1.4 In-Pit Excavators – No-Action Alternative

Maximum annual GHG emissions from the in-pit excavators under the No-Action Alternative would be the same as for the Proposed Action, 657.3 metric tons (724.1 tons) of CO_{2e}/year.

The total maximum annual GHG emissions from haul trucks and excavators for the No-Action Alternative are equal to 3,170 metric tons (3,492 tons) of CO_{2e}/year (2,512.8 metric tons [2,768.0 tons] CO_{2e} from haul trucks and 657.3 metric tons [724.1 tons] CO_{2e} from excavators).

B.1.2 Criteria Air Pollutant Emissions from Vehicles and Construction Equipment

In addition to GHG emissions, the haul trucks and excavators would emit criteria air pollutants. Criteria air pollutants include volatile organic compounds, also known as reactive organic gases (ROG), carbon monoxide (CO), oxides of nitrogen (NO_x), oxides of sulfur (SO_x), and PM. Particulate matter of concern, and thus regulated by state and federal regulations, are small diameter components (PM₁₀ [particles 10 micrometers in diameter or smaller] and PM_{2.5} [particles smaller than 2.5 micrometers in diameter]). Emissions of SO_x would be minor due to the use of ultra-low sulfur fuel.

Estimated maximum annual criteria pollutant emissions are summarized in Table B-2. Since the proposed expansion of borrow pits would result in continuation of an existing ongoing practice of removal and use of borrow pit material, no substantial increase in overall air emissions would be envisioned to result from the Proposed Action Alternative. The No-Action Alternative would result in an increase of air emissions due to further distances traveled by the haul trucks.

**Table B-2. Maximum Annual Criteria Pollutants (tpy)
[metric tons/yr].**

NO _x	CO	ROG	SO _x	PM ₁₀	PM _{2.5}
Proposed Action Alternative					
15.76 [14.31]	3.70 [3.36]	0.79 [0.72]	0.02 [0.018]	37.0 [33.6]	4.30 [3.90]
No-Action Alternative					
28.33 [25.72]	6.98 [6.34]	1.52 [1.38]	0.03 [0.027]	82.0 [74.4]	9.25 [8.40]

Appendix B

Criteria pollutants are generated from material handling and transport activities at each borrow pit in the following four ways:

1. Exhaust emissions from diesel haul trucks
2. Exhaust emissions from diesel excavators
3. Fugitive dust emissions from excavator loading borrow material into diesel haul trucks and haul truck dumping at the receiving location
4. Fugitive dust emissions from haul traffic on unpaved roads.

Details for each of the component contributions are discussed below.

B.1.2.1 Exhaust Emissions from Diesel Haul Trucks

Exhaust emissions from diesel haul trucks have two components: running emissions and idling emissions. Emissions of each criteria pollutant were calculated using the following equation for maximum annual operations:

$$\text{Emissions} = \text{EF}_{\text{running}} \times \text{VMT} + \text{EF}_{\text{idling}} \times \text{Vehicle Operating Days}$$

Data for on-road truck EFs for criteria pollutants were obtained from the California Air Resources Board emissions model (CARB 2011) (<http://www.arb.ca.gov/msei/msei.htm> [CARB 2012]). The EFs are based on the California statewide fleet for in-use “Heavy Heavy Duty Diesel Tractor Trucks” (Gross Vehicle Weight Rating >33,000 lb) operating during 2011, considering all model years and speeds. The PM₁₀ and PM_{2.5} EFs include contribution from tire wear and break wear. A total of 1,014,019 km (630,217 truck miles) is estimated for the maximum operating year for the Proposed Action Alternative and 2,322,799 km (1,443,629 truck miles) for the No-Action Alternative. The number of truck operating-days was calculated to be 2,625.9 per year for the Proposed Action Alternative and 6015.1 per year for the No-Action Alternative, used in calculating idle emissions. Truck running and idling emissions during the maximum operating year are presented in Tables B-3 and B-4.

**Table B-3. Maximum Annual Truck Running
Emission Rates (tpy) [metric tons/yr].**

NO _x	CO	ROG	SO _x	PM ₁₀	PM _{2.5}
Proposed Action Alternative					
9.66 [8.77]	2.49 [2.26]	0.55 [0.50]	0.01 [0.009]	0.46 [0.42]	0.39 [0.35]
No-Action Alternative					
22.12 [20.08]	5.71 [5.18]	1.27 [1.15]	0.03 [0.027]	1.06 [0.96]	0.89 [0.81]

Appendix B

**Table B-4. Maximum Annual Truck Idling Emission Rates (tpy)
[metric tons/yr].**

NO _x	CO	ROG	SO _x	PM ₁₀	PM _{2.5}
Proposed Action Alternative					
0.08 [0.073]	0.04 [0.036]	0.01 [0.009]	0.0001 [0.00009]	0.0013 [0.0012]	0.0012 [0.0011]
No-Action Alternative					
0.19 [0.17]	0.10 [0.091]	0.02 [0.018]	0.0002 [0.00018]	0.0030 [0.0027]	0.0028 [0.0025]

B.1.2.2 Exhaust Emissions from Diesel Excavators.

Emissions of each criteria air pollutant from excavators were calculated using the following equation for maximum annual operations:

$$\text{Emissions} = \text{EF} \times \text{Power rating} \times \text{Load Factor} \times \text{Hours of Operation}$$

Excavator EFs were obtained from the U.S. Environmental Protection Agency's (EPA's) *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition* (EPA 2010a). Excavators were assumed to have a 380 hp (283 kw) rating. A load factor (fraction of overall power consumed over the course of a day) of 0.53 applies to excavators (EPA 2010b, 2010a). Excavators were estimated to be operating for 6,248 hours during the maximum operating year, during either the Proposed Action or No-Action Alternatives. Maximum annual emission rates for excavator operation during either alternative are presented in Table B-5.

**Table B-5. Maximum Annual Excavator Emission Rates (tpy)
[metric tons/yr].**

NO _x	CO	ROG	SO _x	PM ₁₀	PM _{2.5}
6.02 [5.47]	1.17 [1.06]	0.23 [0.21]	0.0069 [0.0063]	0.18 [0.16]	0.18 [0.16]

B.1.2.3 Fugitive Dust Emissions from Excavators Loading Borrow Material into Diesel Haul Trucks

Fugitive dust (PM) emissions are generated when excavators load material into haul trucks. The standard equation in EPA (2011) for calculating these emissions is:

$$\text{EF} = k \times (0.0032) \times \frac{(U/5)^{1.3}}{(M/2)^{1.4}} \times (1 - \text{control efficiency}) \quad [\text{lb/ton}]$$

Appendix B

where:

PM ₁₀ Factor, k	= 0.35
PM _{2.5} Factor, k	= 0.053
U (wind speed)	= 7.61 mph (3.40 m/sec)
M (moisture content)	= 2.8%
Control efficiency	= 70% by application of water spray
ton	= tons of throughput of material being dumped.

The average annual wind speed was obtained from PNNL-19455, *Hanford Site Environmental Report for Calendar Year 2009* (PNNL-20548). Moisture content was obtained from the Washington Closure Hanford Environmental Restoration database. Control efficiency due to applying water spray during loading was obtained from a *Compilation of Air Pollutant Emission Factors* (EPA 2012). The controlled EFs for PM₁₀ and PM_{2.5} are 0.000362 lb/ton and 0.0000548 lb/ton, respectively.

Based on the estimated throughput of 5,066,864 tons (4,599,699 metric tons) during the maximum year, excavator load-in emissions of PM₁₀ are estimated to be 1.84 tpy (1.67 metric tons/yr) and emissions of PM_{2.5} are estimated at 0.28 tpy (0.25 metric tons/yr).

B.1.2.4 Fugitive Dust Emissions from Haul Traffic on Unpaved Roads

Fugitive dust emissions from haul traffic on unpaved roads is calculated using the standard equation in EPA (2012) for travel on unpaved industrial roads:

$$EF = k \times (s/12)^a (W/3)^b \times (365-P)/365 \text{ [lb/VMT]}$$

where:

s	= 14.7 surface material silt content (percent) (WHC 1991)
W	= 27 tons (mean vehicle weight; assume average of loaded truck weight and empty truck weight) (24.5 metric tons).

The constants are:

Constant	PM ₁₀	PM _{2.5}
k	1.5	0.15
a	0.9	0.9
b	0.45	0.45

The resulting uncontrolled EFs are PM₁₀ = 3.65 lb/VMT and PM_{2.5} = 0.36 lb/VMT.

Assuming frequent watering throughout the day would provide 90% control and assuming the percentage of total truck distance traveled onsite that is on unpaved roads is 30%, with 630,217

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and 1,443,629 total onsite miles (1,014,019 and 2,322,799 km) traveled during the maximum operating year for the Proposed Action Alternative and the No-Action Alternative, respectively. PM₁₀ emissions are estimated to be 34.5 tpy (31.3 metric tons/yr) and 79.0 tpy (71.7 metric tons/yr), and PM_{2.5} emissions are estimated at 3.5 tpy (3.2 metric tons/yr) and 7.9 tpy (7.2 metric tons/yr).

B.2.0 TOXIC AIR POLLUTANT EMISSIONS

Potential emissions of toxic air pollutants associated with vehicle and construction equipment operations have been estimated for benzene, formaldehyde, acetaldehyde, and 1,3-butadiene (0000X-CA-V0022), and are summarized here. Toxic air emissions are estimated using *Emissions of Criteria Pollutants, Toxic Air Pollutants, and Greenhouse Gases, from the Use of Alternative Transportation Modes and Fuels* (Delucchi et al. 2006), which allows for estimating gaseous emissions of toxic air pollutants as a fraction of ROG emissions, for diesel-powered vehicles. These fractions are presented in Table B-6.

Table B-6. Fraction of ROG from Diesel-Powered Vehicles.

Benzene	Formaldehyde	Acetaldehyde	1,3 Butadiene
0.011	0.029	0.008	0.014

Applying these fractions to the estimated quantity of ROG emissions of 0.79 tpy (0.72 metric ton/yr) for the Proposed Action Alternative and 1.52 tpy (1.38 metric ton/yr) for the No-Action Alternative (see Table B-2), maximum annual air toxics can be calculated. The results are presented in Table B-7.

Table B-7. Toxic Air Pollutant Emission Rates from Diesel-Powered On-Road Trucks And Construction Equipment (tpy) [metric tons/yr].

Benzene	Formaldehyde	Acetaldehyde	1,3 Butadiene
Proposed Action Alternative			
0.009 [0.008]	0.023 [0.021]	0.006 [0.005]	0.011 [0.010]
No-Action Alternative			
0.017 [0.015]	0.044 [0.040]	0.012 [0.011]	0.021 [0.019]

Considering the quantity of toxic air pollutant emissions and the fact that they would be spread over a majority of the Hanford Site, they should not pose any measurable impact to human health.

B.3.0 PARTICULATE MATTER EMISSIONS MODELING

Emissions of dust (PM) could occur during excavation and loading of borrow pit materials and during transportation on unpaved roads. Water is used to control dust during excavation and transportation. Exhaust emissions of PM are also generated from the operation of the haul trucks and excavators. The EPA has established standards for PM under the National Ambient Air Quality Standards (NAAQS) at 40 CFR 50, “National Primary and Secondary Ambient Air Quality Standards.” The EPA has established 24-hour standards for PM₁₀ and 24-hour and annual standards for PM_{2.5}.

Three borrow pits were evaluated to estimate the potential impacts from PM₁₀ and PM_{2.5}. Air dispersion modeling via a screening-level analysis was conducted to estimate maximum offsite impacts from project-generated particulate emissions. This is a conservative health-protective approach that uses worst-case meteorology to determine the maximum potential air quality impact. The details of the modeling are documented in the “Air Dispersion Modeling Analysis for Expansion Borrow Pits 6, 24, and 36” (0000X-CA-V0023) and are summarized below.

The modeling was performed using the EPA’s SCREEN3 Model Version 96043 to predict maximum 1-hour ground-level concentrations from a single source. The PM₁₀ and PM_{2.5} emissions from the four sources discussed in Section B.1.2 were considered for all activities on the pit site plus truck-generated exhaust PM and fugitive dust PM emissions from the pit site to the nearest paved road. The sum of PM₁₀ and PM_{2.5} emissions were assumed to be emitted from a single volume source located in the borrow pit site.

The SCREEN3 modeling was executed using regulatory default settings and rural dispersion coefficients. A full meteorological array of wind speeds and atmospheric stability classes was evaluated in the dispersion analysis. The analysis used the simple terrain feature because receptors were determined to be below the effective stack heights of the release. The modeling was performed separately for three locations (Pit 36, Pit 24, and Pit 6) for the Proposed Action Alternative. These three pits were deemed to represent reasonable worst-case scenarios based on material throughput, truck traffic on the borrow pit site and new unpaved roads, and distance to potential public receptors.

Two modeling scenarios were constructed. In the first, “maximum 24-hour” scenario, maximum daily emissions were modeled to predict a maximum 1-hour concentration that was then converted using an appropriate factor for volume sources to predict a maximum expected 24-hour concentration at the closest point on the Columbia River riverbank. In the second, “maximum annual” scenario, maximum annual emissions were modeled to predict a maximum 1-hour concentration that was then converted using an appropriate factor for volume sources to predict a maximum expected annual concentration at the closest point off the Hanford Site.

Maximum predicted 1-hour concentrations modeled to the “maximum 24-hour” scenario were multiplied by a factor of 0.15 to convert to a maximum predicted 24-hour average concentration,

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in accordance with the Colorado Department of Health and Environment's "SCREEN3 Stationary Source Modeling Guidance" (CDPHE/APCD 2005) for volume sources (EPA SCREEN3 guidelines only [EPA 1995] address factors appropriate for point sources, not area or volume sources). Similarly, SCREEN3 modeled maximum 1-hour concentrations in the "maximum annual" scenarios were multiplied by 0.03 to convert to maximum annual concentrations (CDPHE/APCD 2005).

The No-Action Alternative was not modeled. Under the No-Action Alternative, annual impacts associated with Pit 6 would increase as additional material would be excavated. Under the No-Action Alternative, Pit 24 would only be available for a limited period of time, after which most of the material for the 100 Area would be obtained from Pit 23, which is located much further from the Columbia River (the hypothetical maximum impact point) than Pit 24. Under the No-Action Alternative Pit 36 would not be established as a new borrow pit.

The results of the modeling analysis are presented in Table B-8. Ambient air concentrations of PM₁₀ and PM_{2.5} are added to predicted project impacts and the sums are compared to the NAAQS. In all scenarios, the results are below the NAAQS. Areas that meet ambient air quality standards are said to be "in attainment" by the EPA. Benton County and the Hanford Site are "in attainment" for all federal and state ambient air quality standards.

As noted previously, the potential future emissions from the Proposed Action Alternative are believed to be comparable to past emissions and would not result in a substantial increase in emissions.

Table B-8. Maximum Predicted Total Impacts Compared to NAAQS. (2 Pages)

Site/ Contaminant	Averaging Time	Predicted Maximum Project Impact ($\mu\text{g}/\text{m}^3$)	Average Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Total Predicted Maximum Impact (Project + Ambient) ($\mu\text{g}/\text{m}^3$) ^a	NAAQS ($\mu\text{g}/\text{m}^3$)
Pit 6					
PM ₁₀ ^a	24-hour	21.7	18 ^b	39.7	150
PM _{2.5}	24-hour	2.5	4.5	7.0	35
PM _{2.5}	Annual	0.054	4.5	4.6	15
Pit 24					
PM ₁₀ ^a	24-hour	30.2	18	48.2	150
PM _{2.5}	24-hour	4.7	4.5	9.2	35
PM _{2.5}	Annual	0.009	4.5	4.5	15
Pit 36					
PM ₁₀ ^a	24-hour	36.6	18	54.6	150
PM _{2.5}	24-hour	4.1	4.5	8.6	35
PM _{2.5}	Annual	0.01	4.5	4.5	15

^a Note: In 2006, EPA revoked the annual standard for PM₁₀ because available evidence did not suggest a link between long-term PM₁₀ exposure and health problems. However, WAC 173-470-100, "Ambient Air Quality Standards," maintains an annual standard for PM₁₀ which is the same as the revoked federal standard, 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), annual arithmetic mean. Due to a variety of factors (including results of the 24-hour modeling analysis for PM₁₀ and annual PM_{2.5}, limited number of days of operation per year, and the factor to convert maximum hourly to

Table B-8. Maximum Predicted Total Impacts Compared to NAAQS. (2 Pages)

Site/ Contaminant	Averaging Time	Predicted Maximum Project Impact ($\mu\text{g}/\text{m}^3$)	Average Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Total Predicted Maximum Impact (Project + Ambient) ($\mu\text{g}/\text{m}^3$) ^a	NAAQS ($\mu\text{g}/\text{m}^3$)
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annual concentration for a volume source (0.03 versus 0.15 for a 24-hour), it is concluded that the annual predicted concentration of PM₁₀ would be well below the state standard of 50 $\mu\text{g}/\text{m}^3$ and modeling this scenario would not be necessary.

^b The ambient PM₁₀ concentration (18 $\mu\text{g}/\text{m}^3$) is based on the annual average measured at the Benton Clean Air Authority monitoring station in Kennewick in 2006 (the observed annual average PM₁₀ concentration at the HMS was 13 $\mu\text{g}/\text{m}^3$, but this was only based on 149 days of observations). The annual average PM_{2.5} concentration at the HMS during 2006 was 4.5 $\mu\text{g}/\text{m}^3$ (PNNL-6415).

EPA = U.S. Environmental Protection Agency
HMS = Hanford Meteorology Station
NAAQS = National Ambient Air Quality Standards
PM = particulate matter
WAC = *Washington Administrative Code*

B.4.0 REFERENCES

- 0000X-CA-V0022, 2013, “Annual Air Emissions for Expansion Borrow Pits – Proposed Action and No-Action,” Rev. 1, Washington Closure Hanford, Richland Washington.
- 0000X-CA-V0023, 2013, “Air Dispersion Modeling Analysis for Expansion Borrow Pits 6, 24, and 36,” Rev. 1, Washington Closure Hanford, Richland Washington.
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- EPA, 2010b, *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling*, EPA 420-P-02-014, NR-005d, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, Washington, D.C.
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- PNNL-19455, 2010, *Hanford Site Environmental Report for Calendar Year 2009*, Rev. 0, Pacific Northwest National Laboratory, Richland, Washington.
- PNNL-20548, 2011, *Hanford Site Environmental Report for Calendar Year 2010*, Pacific Northwest National Laboratory, Richland, Washington.
- WHC, 1991, *Physical Treatment of Hanford Waste Sites Engineering Study*, WHC-SD-EN-ES-006, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WAC 173-470, “Ambient Air Quality Standards for Particulate Matter,” *Washington Administrative Code*, as amended.

APPENDIX C

COMMENT LETTERS AND DOE RESPONSES
ON DRAFT DOE/EA-1934

APPENDIX C

COMMENT LETTERS AND DOE RESPONSES ON DRAFT DOE/EA-1934



Confederated Tribes and Bands
of the Yakama Nation ERWM

Established by the
Treaty of June 9, 1855

January 10, 2013

Paula Call
NEPA Document Manager
Borrow Area Expansion EA
U.S. Department of Energy
P.O. Box 550, Mailstop A2-15
Richland, Washington 99352

RE: Environmental Assessment for Expansion of Borrow Areas on the Hanford Site, DOE/EA-1934 Draft

Dear Ms. Call:

YN ERWM Comments: DOE/EA-1934 Draft-Environmental Assessment for Expansion of Borrow Areas on the Hanford Site

1. *An EA is a "concise public document" containing "sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." (40 C.F.R. 1508.9)*

Statements are made within the NEPA documents which are incomplete and misleading to the public. The NEPA document indicates, ALL cultural work has been completed for the expansion of each borrow pit, yet there is non-concurrence on several projects and one project that has not even completed the 30 day review process. Information gathered from Section 106 process was to be used to ensure compliance with NEPA, yet the Section 106 cultural reviews are either, not complete, dated, or inadequate, with the use of Section 106 "no potential to cause effect" (NPCEs) reports, or in need of further consultation. The public is misinformed as to the status of the section 106 reviews with the publication of the EA in its present state.

The following examples provide a basis for retraction of this draft EA until issues are resolved.

- The review for borrow pit #36 is NOT complete. It has just started a 30 day review process under Project # 2012-100-024. The NEPA document acknowledges the site is visible from the TCP, yet refers to Section 3.1 for mitigation measures, and further states "significant adverse impacts to visual resources are not anticipated". There has been no consultation as to the significance of impacts from this project.
- The NEPA review indicates a proposed action for the expansion of N-Area Borrow pit. This is listed separate from the new Borrow 36. YN ERWM was not aware this was to be part of this NEPA review. The report for this expansion was done under NPCE 2011-100-011. It was the understanding of the Yakama Nation ER/WM cultural staff, NPCE reports were not going to be used for project work. This project requires a FULL cultural review. This project is within the view shed of a TCP and should be addressed accordingly. This report was finalized without Tribal consultation and is inadequate.

- YN ERWM requests consultation on this project due to potential adverse effects to the Mooli Mooli TCP. This should never have been a NPCE.
- The expansion of Borrow Pit 18 was covered under HCRC 2006-600-010. This review is 7 years old. This cultural resource review should be updated to reflect current conditions. The borrow pit activity reflects extreme ground disturbance and should be reviewed for cultural resources accordingly.
 - YN ERWM has concerns with expanding Borrow 24. We never concurred with this project and there was some discussion about a separate MOA. Rob Whitlam (State Historic Preservation Office) agreed at the time a MOA should be considered. The expansion does not connect with the current borrow pit. YN ERWM would like further consultation on this Borrow Pit Expansion, which should include Hanford Tribes and SHPO, as the CTUIR had also requested a separate MOA. Consultation on this project ended without a final resolution.
 - The Cultural Review for Pit 30 was done under NPCE 2008-600-014. Please see comments above with regards to the use of NPCE project reviews. This project requires a complete cultural review.
 - YN ERWM has concerns with Project 2012-100-023 with regards to the proximity to the Mooli Mooli TCP and had requested further discussion. This has not happened, the cultural review for this project is not considered complete.
 - YN ERWM had concerns with Project 2012-600-037 with regards to a TCP study and did not concur with the project. On October 15, 2012 SHPO retracted their concurrence on this project, therefore this cultural review should not be considered complete.
 - The cultural review for Borrow Area F was performed under HCRC 2003-100-001. This CRR is 10 years old. Is the survey of the area of equal age? This CRR should be updated and re-submitted.
2. The purported purpose and need for agency action in this EA is to meet DOE's need to secure raw aggregate sand and gravel material to support ongoing environmental cleanup restoration projects, as well as construction and maintenance activities across the Hanford site. The statement is made that the existing No-Action alternative borrow areas would be exhausted prior to completion of demolition, remediation, backfill, and construction activities on the Hanford Site (e.g., the N and H pits would be exhausted in 2014 and 2015, respectively, according to current remediation projections), yet his EA does not identify current status (i.e., anticipated available soil volume within current boundaries) of the borrow pits.

Page 2-1 of DOE/EA-1454, Rev. 0, *Environmental Assessment; Reactivation and Use of Three Former Borrow Sites in the 100-F, 100-H, and 100-N Areas, March 2003* states environmental restorations projects in these areas will require approximately 1,104,000 bcm of fill material over a period of approximately 10 years (until 2012) both to backfill remedial action waste sites and to fill voids at the Interim Safe Storage (ISS) reactor sites. These needs are also listed in Table 2-1. Pits # 18, 21, and 23 were also in existence during this period.

Table 3-1 of DOE/EA-1934 Draft includes all these sites and request expansion of approximately 3,720,000 bcm. This is over three (3) times the amount of fill material as determined as recently as 2003. This amount does not include the proposed new pit (#36). If included, it alone would add an additional 1,312,000 bcm bringing the total to approximately 5,032,000 bcm. This is basically five (5) times the projected required amount of fill materials since 2003. This is an unsupported requested for what has been identified as *Anticipated Project Use*^d. The footnote includes "the anticipated use indication is not intended to limit the use of borrow material to only those sites listed." Projected remediation and demolition areas

may or may not remain as the public believes. The fill materials may be used in other areas which have not been defined within the scope of this EA.

Table 3-2, DOE/EA-1934 draft, indicates need to travel additional miles to secure soils should expansion not be approved, yet the EA does not evaluate and should potential air impacts should the No-Action Alternative be chosen. Alternatives should be able to be fully evaluated against each other.

Furthermore, *proposed changes to the Hanford Federal Facility Agreement and Consent Order (HFFACO-TPA) currently out for public comment (12-10-2012 to 1-24-2013) which prioritizes additional cleanup work indicate extension of interim and final cleanup dates of waste sites along the River Corridor and in the Central Plateau from five(5) to ten (10) years.*

Given these facts, the YN ERWM does not support the premise or the need to have an accelerated push to allocate additional soils or create new Borrow sites at this time.

3. The following documents are cited as references on how the Borrow Sites will be closed/restored, etc. The first three are available through the Hanford Administrative Record data base; however, the fourth does not seem to be. It was a key document early in the process and it was intended to provide a framework for the planning, operations, and closure/restoration of borrow pits and quarries and was developed as part of a series of resource management plans needed to implement the HCP EIS. Furthermore, none of the available documents adequately describe or define the closure process for the Borrow sites. Please provide a copy of the Draft Industrial Mineral Resources Management Plan (DOE-RL 2000a) as well as more clearly define the process and the criteria for closure and revegetation of the borrow sites.
 - Hanford Site Biological Resources Management Plan (DOE/RL-96-32)
 - Hanford Cultural Resources Management Plan (DOE/RL-98-10)
 - Hanford Site Biological Resources Mitigation Strategy (DOE/RL-96-87)
 - Draft Industrial Mineral Resources Management Plan (DOE-RL 2000a)
4. The YN ERWM requests DOE provide a Mitigation Action Plan with this EA. In certain circumstances, as specified in §1021.322(b)(2), DOE shall also prepare a Mitigation Action Plan for commitments to mitigations that are essential to render the impacts of the proposed action not significant. The Mitigation Action Plan shall address all commitments to such necessary mitigations and explain how mitigation will be planned and implemented. The Mitigation Action Plan shall be prepared before the FONSI is issued and shall be referenced therein.
5. This EA does not include a clear explanation of the current status of these sites (e.i., previous estimations of soil volumes needed for projected workscope compared to actual volumes removed for this previously identified workscope and in which waste sites these soils were actually used as backfill). Nor does it include an evaluation of the estimated cumulative effects of expansion of these sites on wildlife, biota, or human activities (specifically Tribal uses) into the future.
6. DOE coordinated with the USFWS concerning interactions with the Hanford Reach National Monument during preparation of this EA. Please make these discussions available for informational purposes.
7. The YN ERWM requests this information be included within this EA.

The Yakama Nation ERWM Program looks forward to dialog on these concerns and comments.

If you have any questions, please contact Russell Jim, Dana Miller or Rose Ferri at (509) 452-2502.

Sincerely,



Russell Jim, Manager
Yakama Nation
ER/WM Program

cc: Matt McCormick, U.S. Department of Energy, Richland Office
Scott Samuelson, U.S. Department of Energy, Office of River Protection
Dennis Faulk, U.S. Environmental Protection Agency
Stuart Harris, Confederated Tribes of the Umatilla Indian Reservation
Russell Jim, Yakama Indian Nation
Gabriel Bohnee, Nez Perce Tribe
Ken Niles, Oregon Department of Energy
Susan Leckband, Hanford Advisory Board
Ken Niles, Oregon Department of Energy
Marlene George, Yakama Nation ERWM
Administrative Record

Appendix C

DOE RESPONSE

DOE's proposed action is to secure additional borrow material in a manner that minimizes resource impacts by expanding previously established borrow areas that are located in proximity to the environmental cleanup, construction and maintenance projects in need of the materials. This approach has the added benefit of reducing resources that would be expended (e.g., fuel) by transporting borrow materials from farther distances. DOE will mitigate for impacts that cannot be avoided, as documented in the Mitigation Action Plan for DOE/EA-1934, and in conformance with applicable Hanford Site management plans.

Language to clarify the need for additional borrow material has been added to Section 3.1 of the EA, and also appears in Section 5.1. Unexpected soil removal volume from chromate spills in the 100 Areas was largely responsible for the underestimation of the foreseeable volumes in the previous EAs. Expertise and past experience performing cleanup, construction and maintenance tasks on the Hanford Site, and design information if available, were used to produce estimates of the borrow material quantities. GIS technology was used to convert the quantities to a geographic image and to estimate the acreage that will be affected at each pit (Appendix A). Volumes were estimated on a pit-specific basis based on the reasonably foreseeable needs for projects planned nearby. With the experience gained to date, the quantity of material identified in this EA better reflects the reasonably foreseeable needs for sand and gravel to support ongoing remediation of the Hanford Site.

The remedial and support actions that DOE takes to clean up contamination are largely identified in Tri-Party Agreement decisions such as CERCLA Records of Decision (RODs), Action Memoranda, and Explanations of Significant Differences. The proposed action would support the projected needs based on current remedial and removal action decisions and the estimated volumes needed to fulfill the requirements in those decision documents. These decision documents generally include a requirement to restore the remediated area to blend with surrounding topography and grade. In some cases DOE may reach agreements with the lead regulatory agency in charge of cleanup decisions to backfill to less than surrounding grade. This approach can reduce the need for borrow material. Those decisions are typically negotiated on a case-by-case basis.

The NHPA Section 106 cultural resource reviews to cover the expanded pits and new pit under the Proposed Action were either complete or in progress at the time of EA public review. In most cases, a new Section 106 review was conducted specifically for the areas identified in Appendix A of the EA. In other instances, Proposed Action locations had undergone cultural resource reviews in the past, and a new Section 106 review was not required. In these cases, DOE evaluated the past cultural resources reviews and verified that the Section 106 conclusions were adequately supported. Anticipated impacts and mitigation measures identified through the Section 106 processes for each pit were included in the draft EA and are documented in the final EA and Mitigation Action Plan after additional consultation.

Development of specific closure plans is most feasible and efficient when the final configuration of a given pit is known and this level of detail is beyond the scope of DOE/EA-1934. The final footprint for each borrow area will fall within the footprint identified in the Proposed Action, but

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may have an as-yet undetermined shape. Re-contouring of borrow pits as appropriate will be based upon the final configuration of the pit as well as the condition of surrounding terrain. As described in the EA, closure of pits will include re-vegetation in accordance with applicable Hanford Site management plans.

The EA was a draft document at the time this comment was received. All Section 106 reviews needed to support a NEPA decision were anticipated to have been completed prior to the approval of the NEPA action. In the case of Pit 36, however, consulting parties raised concerns regarding potential impacts to the TCP, *Mooli Mooli* during the Section 106 30-day review period and during the EA comment period. Because of these concerns and to allow for their resolution, DOE continues to consult on Pit 36.

This area was entirely surveyed for cultural resources under *Fiscal Year 1991 Report on Archaeological Surveys of the 100 Areas (HCRC#91-100- CERCLA)*. A portion of the proposed action location was surveyed under *Cultural Resources Review for Group 5, 100 K Remedial Action-Backfill (HCRC#97-100-013g)*. No historic properties or cultural resources were identified during these survey or reviews. The *No Potential to Cause Effects (NPCE) Cultural Resources Review for the Ten Percent Expansion of the Borrow Pit at the 100-N Area (NPCE#2011-100-011)* for the expansion area was written using information from previously consulted cultural resource reviews under Section 106.

With respect to potential impacts to views from the *Mooli Mooli* TCP, the EA has been revised to address that between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the *Mooli Mooli* TCP was submitted to the DOE. The new boundary encompasses the 100-N borrow pit proposed action location. Actions that would minimize impacts to the view from the *Mooli Mooli* TCP are part of the proposed action and are described in Section 3.1 of the EA. Such actions would include berming the topsoil from the expansion area on the north, east, and south sides of the 100-N borrow pit expansion. Additionally, upon borrow pit closure, the 100-N borrow pit will be contoured and re-vegetated to blend with the surrounding terrain.

Pit 18 is included in this EA for the purpose of documenting the existing lateral expansion of the current disturbed area, and no additional lateral expansion is planned. Continued use of Pit 18 is anticipated and would include removal of material to a greater depth without lateral surface expansion. Inclusion of Pit 18 in this EA helps to ensure that future use would be managed within the authorized boundaries, and that current borrow pit operational, mitigation, and closure requirements would be followed. Any future lateral expansion of this pit may require additional evaluation under NEPA and NHPA.

The Pit 24 proposed action location was reviewed and surveyed for cultural resources under *Cultural Resources Review for the Expansion of the Borrow Pit 24 in the 100 B/C Area of the Hanford Site, Benton County, Washington (HCRC#2011-100-057)*. The finding of this cultural resources review was No Adverse Effect to Historic Properties, and no MOA was required. No new cultural resources were identified during the survey. One previously identified pre-Hanford farmstead is located within the Pit 24 Proposed Action location as part of *Cultural Resources Review for the Pit 24 Borrow Expansion HCRC#98-600-005 and HCRC#98-600-005a*. This

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farmstead was determined eligible to the National Register of Historic Places (NRHP). The Washington State Department of Archaeology and Historic Preservation signed the “Memorandum of Agreement for Mitigation of the Fry and Conforth Farm (HT-95-050)” (Griffith 1998); the Advisory Council on Historic Preservation signed the “Memorandum of Agreement Regarding the Expansion of Gravel Pit 24, Hanford Site, WA” (Crisler 1998). The current borrow pit and the proposed expansion are only separated by the haul road and are connected by location, biology and geomorphology.

The proposed action locations were surveyed for cultural resources under *Cultural Resources Review of Retrieval, Treatment and Disposal of Tank Waste and Closure of Single Shell Tanks (Tank Closure) Environmental Impact Statement (EIS)* (HCRC# 2003-200-044), *Expansion of Gravel Pits 23 and 30 Project, A Cultural Resources Inventory Report* (HCRC#93-600-002), and *Cultural Resources Report Narrative: Spent Nuclear Fuel Storage Facility* (HCRC#94-600-042). The Pit 30 proposed action location was cleared under an NPCE in February 2008. No historic properties or cultural resources were identified during these surveys or reviews.

Between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the *Mooli Mooli* TCP was submitted to the DOE and is being finalized. The new boundary is in proximity to Pit 21. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Adverse impacts to the *Mooli Mooli* TCP visual resources will be mitigated by berming the topsoil from the expansion area on the south side of the Pit 21 expansion.

The SHPO concurrence was not retracted for Pit 6 (HCRC#2012-600-037).

The F Pit is included in this EA for the purpose of documenting the existing lateral expansion of the current disturbed area, and no additional lateral expansion is planned. Continued use of F Pit is anticipated and it would include removal of material to a greater depth without lateral surface expansion. Inclusion of F Pit in this EA helps to ensure that future use would be managed within the authorized boundaries and that current borrow pit operational, mitigation, and closure requirements would be followed. The current shape of the F Pit is based on the original HCRC reviews. Any future lateral expansion of this pit may require additional evaluation under NEPA and NHPA.



Oregon

John A. Kitzhaber, MD, Governor



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January 14, 2013

Ms. Paula Call
NEPA Document Manager
Borrow Area Expansion EA
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Richland, WA 99352

Dear Ms. Call:

Oregon appreciates the opportunity to provide comments on the draft *Environmental Assessment for Expansion of Borrow Areas on the Hanford Site* (DOE/EA-1934). We recognize the need for large amounts of borrow material for backfilling remediated waste sites and other purposes at Hanford. We likewise recognize the challenges of obtaining this material while minimizing costs for excavation and transport, and for damage to the environment. However, in considering the work proposed in this EA, we have several concerns.

First, we believe the EA fails to consider what is perhaps the best source of fill material at Hanford. We encourage DOE to carefully consider use of material excavated to create the Environmental Restoration Disposal Facility at Hanford (ERDF). We have been told that some of the stockpiled materials from ERDF will be needed to create a final cover over the landfill, also that some of this material has been promised for use at the U.S. Ecology landfill site. However, that presumably still leaves millions of yards of material that was excavated from the ERDF site and that is lying in unused stockpiles at that location. We have never been able to ascertain why this material is not being used for backfill on remediated waste sites at Hanford. Doing so would obviate much, perhaps all, of the need to excavate additional material from new or expanded borrow sites, and would eliminate the adverse environmental consequences of the expanded excavation proposed in this EA.

It might also be possible to transport this material in empty trucks after waste is disposed at ERDF for return to waste sites being excavated. We recognize there are potential problems with preserving this material as "clean" fill if transported in ERDF cans with small amounts of residual waste, but if transport is possible in vehicles returning from ERDF to active waste sites, it might be possible to significantly reduce transportation costs.

Our second concern is with the finding of no significant impact from the proposed expansion of borrow areas. We disagree with this conclusion, for several reasons:

- The plan describes activities that will result in destruction of almost 200 acres of land surface. Much of the habitat is degraded, but some is high quality. It is also unclear whether the conclusion of no significant impact is based on a presumption that mitigation will be performed and will be successful on all of this area. It is hard to understand how loss of this much habitat – for a prolonged period of time – can be regarded as not significant.
- Descriptions of several of the individual sites (Section 4.2) identify significant habitats that will be destroyed by excavation (100-H – level III habitat, Pipers daisy, mature stands of big sagebrush; Pit 6 – vegetation consists mainly of native species; Pit 21 – Level III habitat, mature big sagebrush and green rabbitbrush; Pit 23 – mature stands of big sagebrush; Pit 30 Level III habitat, Pipers daisy, mature sagebrush). Even if rectification is ultimately successful, the prolonged loss of these habitats represents a substantial net adverse impact to the Hanford ecosystem. Because rectification will apparently not be initiated until excavation of these sites has been completed, and because the success of rectification is far from certain and will take at least several decades in the case of developing mature sagebrush, long-term interim loss of habitat is certain and there is potential for some permanent losses.
- The EA does not provide any information about plans for mitigation. There are no grading specifications or planting lists, no consideration of locations for compensatory mitigation, etc. The general statements that are provided are vague (“... displaced native plants would be replaced through mitigation and/or borrow area closure and revegetation actions. In addition, it is anticipated that once borrow operations cease and closure activities are implemented in a given area, some wildlife species would return to the area naturally.”). They provide no confidence that the authors appreciate the complexity and very long duration of successful mitigation and re-establishment of a mature native plant community.

Third, we believe the overall approach presented in this EA violates both the spirit and the letter of BRMaP. One of the primary goals of BRMaP is to avoid degradation of quality habitat. There is nothing in this EA indicating that DOE seriously considered approaches that would avoid loss of quality habitats at any of the specific locations noted above (100-H, Pit 6, Pit 21, Pit 23, Pit 30). To the contrary, these losses are either written off (“adverse impacts are anticipated to be insignificant relative to the expansion and use of this site” (Section 4.2.8)) or it is suggested that monitoring and mitigation are appropriate. The thrust of BRMaP – to avoid impacts where possible, and to minimize them when unavoidable, has been ignored.

This EA does not appear to mention, let alone embrace, the revised Biological Resources Management Plan (now called BRMP) for the Hanford Site, currently a draft document for which the comment period has recently ended. The updated BRMP will presumably be finalized and

adopted by DOE before most (perhaps any) of the work described in the EA is implemented, so work will presumably need to be done in accord with the revised BRMP. The revised management plan has a variety of changes that can affect habitat level designations, management goals, mitigation requirements, etc., so the approaches described in this plan might need modification to conform with BRMP.

As one of the natural resource trustees for the Hanford Site, we believe it important for DOE to recognize that habitat destruction, including interim losses until full recovery of the borrow sites, will constitute an injury to natural resources under the Natural Resource Damage Assessment (NRDA) provisions of CERCLA. We urge DOE to carefully consider the nature and duration of all actions at borrow pits in order to minimize potential NRDA liability.

Finally, we recommend that DOE reconsider the allowable depth of excavation in borrow pits located in proximity to the Columbia River. The draft EA states that excavation will be allowed to within 2 m of the "typical" groundwater elevation, but we believe it advisable to allow excavation only to within 2 m of the maximum groundwater elevation at each location. Given the very large diurnal and annual changes in water levels in the Columbia River (> 6 m) and resulting changes in groundwater elevation for sites near the river, allowing excavation to within 2 m of an (undefined) "typical" elevation would likely result in frequent, possibly prolonged, occurrence of standing water within the excavated borrow pits. Moreover, because the highest water levels in the river occur during spring and summer months, occurrence of standing water (or even shallow groundwater) would almost certainly result in proliferation of hydrophytic vegetation, likely including at least some exotic, nuisance species.

We look forward to working with DOE to finalize the Borrow Area EA, and to successful implementation of the plan. Should you have any questions or wish to discuss any of our comments, please contact Paul Shaffer of my staff (503-378-4456, paul.shaffer@odoe.state.or.us).

Sincerely,



Ken Niles, Administrator
Nuclear Safety Division

Cc: Hanford Natural Resources Trustees

DOE RESPONSE:

DOE's proposed action is to secure additional borrow material in a manner that minimizes resource impacts by expanding previously established borrow areas that are located in proximity to the environmental cleanup, construction and maintenance projects in need of the materials, rather than developing new borrow areas. This approach has the added benefit of reducing resources that would be expended (e.g., fuel) by transporting borrow materials from farther distances. DOE will mitigate for impacts that cannot be avoided as documented in the Mitigation Action Plan for DOE/EA-1934, and in conformance with applicable Hanford Site management plans.

Stockpiles from construction of Environmental Restoration Disposal Facility cells are planned for future remedial actions in the Hanford Site's Central Plateau.

Federal liability for CERCLA natural resource damage is outside the scope of this document. DOE integrates natural resource concerns into its cleanup and also attempts to minimize injury to natural resources. DOE has analyzed impacts to natural resources in this document and discusses mitigation in the attached Mitigation Action Plan.

Habitat loss as a result of the Proposed Action would be minimal, and mitigation actions will be carried out in conformance with current Hanford Site plans including the Biological Resources Management Plan (BRMaP) and its successor(s). The 187-acre area impacted under the Proposed Action comprises approximately 0.1 percent of the total area designated as "Preservation" under the CLUP. Approximately 11 percent of the area impacted is considered to be high quality habitat, and mitigation will be carried out for these impacts. Upon closure of the areas affected under the Proposed Action, current low-quality habitat areas totaling 65 acres will be restored to Level III habitat, resulting in a net increase in habitat quality.

In order to ensure that disturbance of ecological resources is minimized under the Proposed Action, borrow material would be excavated on an as-needed basis, and only the area needed for material would be disturbed. Consequently, of the 187 acres evaluated for disturbance under the Proposed Action, there is a possibility that not all of this area would be consumed for the purposes of obtaining borrow material. During review of the areas that would be affected by the Proposed Action, recommendations for avoiding impacts to high quality habitat were considered. Mitigation actions for impacts that could not be avoided and are not considered temporary are detailed in the Mitigation Action Plan for this EA. Some of the actions identified are pit-specific, and are summarized below. In response to these comments, discussion on the impacts to habitat was added to the EA document in Section 5.1.5.

Historic well log data was evaluated prior to establishing maximum allowable pit depths. The intent of the Proposed Action in DOE/EA-1934, in accordance with BRMaP and other Hanford Site guidance documents, is to minimize surface footprint disturbance while avoiding creation of permanently wetted areas that could sustain vegetation. During occasional extreme high-flow years, some groundwater could temporarily exist at the bottom of a particular pit. Given the historical data reviewed, these brief peaks are not expected to sustain vegetation. Borrow pits located in the interior area of the Hanford Site, such as Pits 30 and 34, would be less likely to

Appendix C

reach their maximum excavation depths than those closer to the groundwater table (Pits F, H, N, 6, 9, 18, 21, 23, 24, and 36). Other considerations such as safety, aesthetics and restoration may result in a depth shallower than the maximums listed in this table.

Despite several native species noted at Pit 6, their presence is sparse and non-contiguous. Given these attributes, the expansion area under the Proposed Action is not considered habitat of high quality and BRMaP does not require mitigation.

The Proposed Action Pit 23 expansion area also has very low species diversity and richness. The overall low quality and non-contiguous habitat does not require any mitigation. Revegetation upon pit closure will enhance future habitat values at this site.

The Proposed Action location at H Pit consists of relatively poor habitat, although occurrence of Piper's daisy, a BRMaP Level III resource, has been reported. However, the existence of Piper's Daisy is presently unknown at this particular location. An evaluation for the presence of this species will be conducted prior to expansion to determine the appropriate mitigation actions.

The Pit 21 expansion lies within a sagebrush stand that that experienced high mortality for a period of time from approximately 1997 to 2000 and subsequently burned around the years 2006 and 2007. There is a 2.79 acre "island" of Level III habitat that would be impacted by the borrow area expansion; however, this island shows signs of extreme stress and the area is not supporting any recruitment. BRMaP calls for compensatory mitigation to be implemented in the revegetation window immediately following disturbance. It is anticipated that planned mitigation actions for this 2.79 acre island on a 3:1 basis will likely benefit the health of the larger sagebrush stand in this area.

For Pit 30, mitigation will occur in the first available revegetation window on a 3:1 basis and upon pit closure, the expansion area itself will be revegetated in conformance with current Hanford Site plans. The existence of Piper's Daisy is presently unknown at this particular location. An evaluation for the presence of this species will be conducted prior to expansion to determine the appropriate mitigation actions.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
Eastern Washington Field Office
11103 East Montgomery Drive
Spokane Valley, WA 99206



Ms. Paula Call, NEPA Document Manager
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, Mailstop A2-15
Richland, Washington 99352

January 15, 2013

Dear Ms. Call:

Subject: *Environmental Assessment for Expansion of Borrow Areas on the Hanford Site*
DOE/EA-1934, December 2012 Draft.

Thank you for providing the opportunity to comment on the Draft Environmental Assessment for Expansion of Borrow Areas on the Hanford Site. The Department of the Interior, U.S. Fish and Wildlife Service (Service) is interested in providing input on the proposed actions as part of our continuing effort to support DOE's cleanup activities and Natural Resource Damage Assessment and Restoration (NRDAR), and to assure that cleanup and NRDAR activities are efficient and well coordinated with other Tribal, State, and Federal activities at the Hanford Facility.

In general, the Service prefers alternatives that reduce long term habitat disturbance and provide for proper mitigation of lost habitat when disturbance footprints cannot be avoided. The DOE should be aware that any expansion of existing borrow areas and/or proposed new borrow areas may increase potential NRDAR liability. We therefore encourage a prudent approach to any action that may adversely affect trust resources.

Specific Comments:

Purpose and Need for Action: We would like to see more analysis justifying the need for this action. For example, has consideration been given to recontouring the remediation excavation to avoid the need for backfill or at least greatly reducing the volume required? Earlier EAs have also presented projections on volume of borrow area materials required, accuracy of these projections, relationship of current projections earlier projections.

Minimizing Habitat Impact: Although we appreciate the effort to reduce environmental impact and cost by reducing hauling distance for borrow materials, we believe less impact can be achieved avoiding construction and expansion of multiple borrow pits and concentrating use of one or a fewer number of pits. Alternatives, such as taking more material by going deeper or a greater areal extent in fewer locations, should be considered. For example, further expansion of Pit 6 should be considered. To the west of Pit 6 is what has been considered an old bombing practice range, and Pit 6 could be doubled or tripled in size by extending into this area.

Ms. Paula Call

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The location of Pit 6, which is closer to the encroaching development of Richland makes it a more desirable location with respect to protection of habitats than expanding areas closer to and within the Hanford Reach National Monument. While fill would have to be hauled over a longer distance but this would be a small tradeoff to reduce impacts.

Increasing Depth of Excavations: DOE proposes to keep excavations shallow so that ground water is not encountered. The advantage of doing so is unclear in the EA. It may be advantageous to excavate deeper than the ground water level. Studies performed on site indicate that regional management of river levels has reduced and/or eliminated riparian amphibian breeding areas. One of the successful amphibian breeding areas is Borrow Pit 24 (see for example studies on site by Blackburn 2008, and Miller 2010). Thus taking excavations to ground water could provide amphibian breeding areas to replace those lost to river management. DOE has considered wetland creation in the borrow areas before as indicated in this excerpt from the 100-F Temporary Borrow Area notes:

“Material can be excavated to groundwater depth creating a wetland area that would be planted with riparian species along the banks and upland species on the slopes. The wetland would be developed in the western portion of the borrow site (cheatgrass area). The area between the previously mined area to the east and the wetland would also be used for borrow material and would be restored to upland habitat. The final surface would be gently sloped from east to west tying into the wetland. Prior to any material being excavated for use as backfill, the top 12 inches of topsoil will be stockpiled for redistribution across the disturbed areas to facilitate successful revegetation. The banks of the wetland would be planted with tree seedlings. Riparian species including cattail (*Typha latifolia*), willow (*Salix spp.*), bulrush (*Scirpus validus*), and sedges (*Carex spp.*) will move into the area within 3 to 5 years. The upland areas will be revegetated with traditionally planted native species including sagebrush, snow buckwheat (*Eriogonum nivum*), and Sandberg's bluegrass.”

Taking excavations deeper (to ground water) could also increase the amount of material derived from a smaller footprint thereby reducing the areal extent of disturbance for the borrow pits. The Service has raised the concern of development of invasive wetland species if this were to be done but the benefits to wildlife would outweigh the risk of invasive plant species propagation.

Closure Plans & Final Slope: The document states that “After borrow materials are exhausted within a particular pit, slopes would be recontoured to blend stably and naturally with adjacent areas in a pattern that is both aesthetically pleasing and that would support healthy establishment of native communities. Closure of pits would include revegetation in accordance with applicable Hanford Site Management plans. A slope model of 4:1 was used to calculate borrow material quantities for each pit and would be utilized to provide stable slopes during excavations (WDNR 1997).” Other than this reference, there is no indication of what the final slopes will be at closure. Note that the cited document provides a range of slopes for various intensity of land uses (see Figure 4.1 from the document below) and 4:1 is a slope suggested for limited intensity use. The future use of the site would be more likely a low to moderate intensity and for these uses the document suggests slopes from 7:1 to 20:1. Also note that at closure slopes should have a sinuous appearance in both profile and plan view with no large rectilinear topographic elements. The figures in Appendix A of the document show very unnatural appearing shapes for the borrow pits. Final topography generally should comprise sinuous contours, chutes and

Ms. Paula Call

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buttresses, spurs, and rolling mounds and hills, all of which should blend with adjacent topography to a reasonable extent. Straight planar slopes and right angles should be avoided.

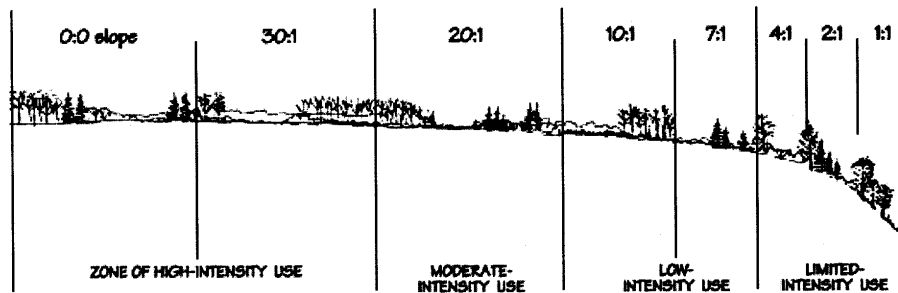


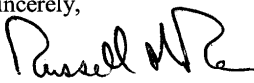
Figure 4.1. The steepness of the final slope strongly influences the intensity of proposed land use for reclaimed mine sites. Fewer options are available on steeper slopes. (From Green and others, 1992.)

Open File Report 96-2

BEST MANAGEMENT PRACTICES FOR RECLAIMING SURFACE MINES

If you have any questions, please contact Dr. Joe Bartoszek at (509) 546-8338 or Russell MacRae at (509) 893-8001.

Sincerely,


 For Ken S. Berg, Manager
 Washington Fish and Wildlife Office

References:

Blackburn, Shannon. 2008. Post-Breeding Dispersal and Terrestrial Habitat Use by Woodhouse's Toad (*Bufo woodhousii*) on the Hanford Reach National Monument. Senior Thesis, Western Washington University.

Miller, Brian F. 2010. Anuran Utilization of a Semi-Arid Regulated River Environment, the Hanford Reach of the Columbia River. MS Thesis, Washington State University.

WDNR, 1997, *Best Management Practices for Reclaiming Surface Mines in Washington and Oregon*, Open file report 96-2, Washington State Department of Natural Resources, Washington Division of Geology and Earth Resources, Olympia, Washington.

Appendix C

DOE RESPONSE

DOE's proposed action is to secure additional borrow material in a manner that minimizes resource impacts by using previously established borrow areas that are located in proximity to the environmental cleanup, construction and maintenance projects in need of the materials. This approach has the added benefit of reducing resources that would be expended (e.g., fuel) by transporting borrow materials from farther distances. DOE will mitigate for impacts that cannot be avoided as documented in the Mitigation Action Plan for DOE/EA-1934, and in conformance with applicable Hanford Site management plans.

Regarding the basis for estimated quantities, volumes were estimated and converted to acres based on the reasonably foreseeable quantities that will be required to complete currently planned cleanup, construction, and maintenance work. Expertise in this type of work, past experience performing these types of tasks on the Hanford Site, and design information if available, were used to produce estimates of the borrow material quantities. GIS technology was used to convert the quantities to a visual image and to estimate the acreage that will be affected at each pit (Appendix A). Volumes were estimated on a pit-specific basis based on the reasonably foreseeable needs for projects planned nearby. Language to clarify the need for additional borrow material has been added to Section 3.1 of the EA, and also appears in Section 5.1.

The remedial and support actions that DOE takes to clean up contamination are largely identified in CERCLA Records of Decision (RODs), Action Memoranda, and Explanations of Significant Differences. The proposed action would support the projected needs based on current remedial and removal action decisions and the estimated volumes needed to fulfill the requirements in those decision documents. These decision documents generally include a requirement to restore the remediated area to blend with surrounding topography and grade. In some cases DOE may reach agreements with the lead regulatory agency in charge of cleanup decisions to backfill to less than surrounding grade. This approach can reduce the need for borrow material. Those decisions are typically negotiated on a case-by-case basis.

Developing engineered wetland areas by excavating to depths that would result in the permanent presence of water does not support the EA purpose and need and is beyond the scope of this EA. Wetland area development may be considered in future plans associated with the finalization of the Hanford Site environmental cleanup mission.

The 4:1 slope model described in the EA provides for slope stability during high intensity use. This sloping model also supports minimization of the resulting disturbed footprint. The Proposed Action includes a requirement to excavate from the disturbed portion of the pit outward in order to minimize surface impacts. In addition, borrow material would be excavated on an as-needed basis to ensure only the area needed for material is disturbed. Development of a specific closure plan is most feasible and efficient when the final configuration of a given pit is known, and it is no longer in use. Speculation regarding final details outside the commitments specified in the MAP is beyond the scope of DOE/EA-1934. The final footprint for each borrow area will fall within the footprint identified in the Proposed Action, but may have an as-yet undetermined shape. Recontouring of borrow pits as appropriate will be based upon the final

configuration of the pit as well as the condition of surrounding terrain. As described in the EA, closure of pits will include revegetation in accordance with applicable Hanford Site management plans.



Nez Perce

TRIBAL EXECUTIVE COMMITTEE

P.O. BOX 305 • LAPWAI, IDAHO 83540 • (208) 843-2253

February 28, 2013

Paula Call
NEPA Document Manager
U.S. Department of Energy
P.O. Box 550, MS A2-15
Richland, WA. 99352

RE: Draft Environmental Assessment (EA) For the Expansion of Borrow Areas on the Hanford Site Review

Dear Ms. Call:

The Nez Perce Tribe appreciates the opportunity to comment on the Department of Energy's (DOE) Draft Environmental Assessment (EA) for the Expansion of Borrow Areas on the Hanford Site Review.

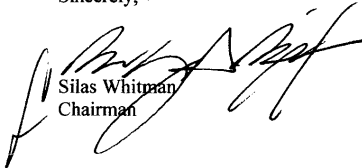
Since time immemorial the Nez Perce Tribal members have fished, hunted and gathered in lands throughout north-central Idaho, northeast Oregon and southwest Washington, including the lands and waters of the area now encompassing the Hanford Reservation. In 1855 the Nez Perce Tribe negotiated a treaty with the United States. Treaty of June 9, 1855, with the Nez Perce Tribe, 12 Stat. 957 (1859). In Article 3 of this treaty, the Nez Perce Tribe explicitly reserved to themselves certain rights, including the exclusive right to take fish in streams running through or bordering the Reservation and "the right to fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

The fishing, hunting, and gathering activities did and still do play a major role in the culture, religion, subsistence, and commerce of the Tribe. As a co-manager of its treaty-reserved resources, the Tribe is intent on protecting, preserving and perpetuating resources for the sake of Nez Perce cultural and economic survival. It is vital that these natural resources be uncontaminated. Once resources become contaminated or lost, part of the Tribe's connection to the land and part of the Tribal culture is lost. The Tribe continues to work with DOE to ensure that the natural resources at Hanford will be available and safe for use by the Tribe.

To meet the communication and consultation needs of the Tribe and other affected Tribes that DOE interacts with, DOE and the Tribes developed DOE Order 144.1. This Order defines a process through which DOE and the Tribes can reach agreements that are protective of tribal treaty reserved rights and resources. The Nez Perce Tribe Environmental Restoration and Waste Management (ERWM) Program appreciates the opportunity to partially fulfill the intent of Order 141.1 by being involved in the development of documents at Hanford.

If there are any questions in regards to the following comments, ERWM would like to suggest a meeting be set up to discuss issues or please contact John Stanfill, ERWM Hanford Coordinator at (208) 621-3748 or johns@nezperce.org.

Sincerely,


Silas Whitman
Chairman

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MAR 19 2013
DOE-RLCC

The following are general comments on the Borrow Area Expansion EA.

- There is an overall inadequate presentation of resources at risk and an inadequate impacts analysis for both the proposed and no action alternatives. The EA format of this document does not follow the NEPA format as outlined in the CEQ regulations. Please provide an adequate Chapter 4 “Affected Environment” and then provide a Chapter 5 “Impacts Analysis” that compares the “Proposed and No Action alternatives. Please add a summary comparison table of resource impacts in Chapter 5.
- There is a general lack of well-presented quantitative information throughout the document. It is either disorganized or not in the document at all, making it difficult for the reader to come to any understanding about significance of resource impacts.
- Many references are missing that would enlighten the reader to critical decisions-making information. A technical document such as this must have properly referenced materials. If often referenced material is not summarized as to its conclusion and relevance to this document, then referenced material should be provided in an appendix for ease of the reviewer.
- Restoration and mitigation information is disorganized and lacking throughout the document. Please reference the section and page numbers of existing restoration measures described in original documents establishing the pits, revised restoration plans, and the mitigation action plan.
- DOE’s Implementation Procedures for NEPA 10 CFR 1021.331 (b) states that a mitigation action plan must be completed before the FONSI can be given for an EA. Please provide a copy of the Mitigation Action Plan in an appendix of the EA.
- There was no consultation with the Nez Perce tribe or its ERWM program specifically about the substance of this EA. ERWM would like to meet with DOE and its contractor to provide more substantive comments on this EA if needed.

The following are more specific comments:

- The “Needs” statement is inadequate. The need for 10,714,000 cubic meters of sand and gravel for the next 10 years is not provided. DOE summarizes the need in the last column of Table 3-1 “Anticipated Project Use”. However, none of this justification is in narrative form in Chapter 1 or 2. There is no mention of the Clean-up RODs along the River Corridor or other actions that create the list of needs listed in Table 3-1.
- Pg. 5-20 states that the Proposed Action will increase borrow areas by 187 acres of new surface disturbance. There is no mention of how a total of 704 acres of open pit mining to within 2 meters of surface water will be actively managed to prevent groundwater contamination. Due to a lack of specific restoration description, no interim measures will occur to prevent groundwater contamination. No restoration or mitigation will occur until a pit is closed. This assumes that all pits will be opened and excavated to a depth of within 2 meters with no description of surface spill prevention, controlling surface run-off, location of fueling or oiling stations, soil stock piling, emergency response, etc.
- The RI/FS and PPs along the river is a large reason for the expansion of these pits, yet these discussions and associated timelines are not mentioned. This CERCLA clean-up effort along the river corridor is the purpose for almost 11 million cubic yds. of clean fill. Please include narrative about upcoming RODs out and their role in the expanded need of fill material from these borrow sources.
- Documents that give the 10.7 million cubic yards of fill estimate should be referenced to provide supporting information.
- Table 3.1 is a good table. “Anticipated project use” (the last column in table 3-1) should be described in the “Needs” Sections, and is an important component of the “Needs” Statement. The table should be referenced more in the document when displaced acres are presented. The table should also include total acres since the proposed action is about evaluating the total acres displaced.
- There should be a separate table in Chapter 4 that summarizes resources at risk. There should also be a summary table of resource impacts in Chapter 5. DOE could start with Table 3-1 and then add columns for vegetation (acres), cultural resources, wetlands, soils, ecological habitats, visual impacts, etc.
- There is no Cost/benefit analysis between the proposed and No action (off site source) alternatives. Transportation and associated economic costs are the largest factors for justifying the expansion of existing pits, yet this rationale is not fully developed and presented. Table 3-2 is the beginning of that conversation. DOE should look at the total miles and associated costs of the proposed action verses an off-site source (no action) to provide economic practicality to the proposed action. Table 3.2 does not belong in the description

section but should be expanded and included in the Chapter 5 alternatives analysis section for transportation and economic impacts.

- Chapters 4 or 5 do not show where or how stockpiled top soils will be managed until it is needed after pit closure ten plus years later.
- CEQ regulations on NEPA provide a format for NEPA documents not followed by this document outline. This creates problems for the document. Some of the problem seems to be that the authors want to address impacts by individual pits. It is based on the proposed action which includes all pits, roads, and stockpiled materials).
- Chapter 4 and 5 are inconsistent. Recommend you change chapter 4 to “Affected Environment” and describe climate, vegetation, wetlands, groundwater, economics, etc. in this chapter for all pits and associated activities. Chapter 5 should present impacts to these environmental elements as a result of the proposed action and the “no action” alternative.
- Chapter 5 needs a summary table that shows a summary of impacts across all resource disciplines (including the pits, roads and stock-piled top soils) and compares impacts to the “No Action” alternative.
- Each resource discipline should be quantified in Chapter 4 as well as possible, and at least qualified. Resource headings should include vegetation, soils, surface water (including wetlands), groundwater, cultural resources, ecological (habitat complexes), wildlife, transportation, economics, sociological, environmental justice, and cumulative impacts.
- Cumulative impacts should address cumulative impacts from other proposed actions by DOE in the area as to resource impacts. It is not a cumulative impact of all the pits only, but rather impacts of all earth disturbing activities planned by all decision making documents in the specified area.
- Some of the needed information for the Chapter 4 “Affected Environment” is misplaced in Chapter 5 as part of the impacts discussion.
- Topsoil stockpiling needs to be discussed as an impact and may need to be part of mitigation. Please call out locations of stockpiled topsoil and the associated types and acres of vegetation displaced in Appendix A figures and Table 3-1. This temporary impact to surface vegetation is part of the proposed action and needs to be included in Chapters 4 and 5. Mention should be made of the 187 acres of topsoil stockpiles.
- Chapter 4 first paragraph. Please make reference to the chapter, section and page numbers for habitat characterizations in the referenced two documents.
- Section 4.2.1, through Section 4.2.12 inadequately describes the resources at risk. There is no quantitative information provided even though some information is readily available in chapter 5.
- There is need for a more thorough description of the following resources: soils, surface water quality/quantity, groundwater, economics, transportation, and cultural resources.
- There needs to be a robust section that discusses groundwater quality under the 704 acres of pits.
- There needs to be a discussion of how DOE will manage surrounding industrial activities and run-off into the pits that could contaminate groundwater. Open pits to within 2 meters of groundwater are vulnerable to groundwater contamination by fueling, equipment maintenance, and contaminant run-off. None of these issues are even mentioned.
- The mitigation action plan needs to be completed and finalized prior to the FONSI (10 CFR 1021.331(b)). It is ERWM’s recommendation that it be completed and attached as an appendix.
- It is not clear if Section 106 consultation was successfully completed with the Nez Pere Tribe’s Cultural Resources Program. None of the meetings or consultation accomplishments are called out in Chapter 7. “Consultation and Coordination”. Just including the Nez Perce Tribe in the list of agencies is inadequate according to CEQ regulations for NEPA.
- Please reference and summarize the details and timelines for restoration and mitigation of the proposed action in Chapter 5.
- The air quality modeling effort should predict threshold of unhealthy air quality conditions based on a combination of industrial equipment used and weather conditions at the pits. Please provide weather conditions and air quality criteria that would trigger pit operations suspension for the safety of workers.
- There needs to be a summary table comparing resource impacts of the proposed and No action alternatives. These impacts need to include temporary impacts from stockpiled top soils and their management. Location of stockpiled top soils needs to be shown on figures in Appendix A.
- 10 CFR 1021.331(b) states “The Mitigation Action Plan shall be prepared before the FONSI is issued and shall be referenced therein”. To comply, DOE should prepare the MAP and have it as an appendix in the EA.

- One of the critical resource elements missing from the EA was the transportation and associated economic costs between the proposed action and the no action (outside borrow sources). The transportation and associated economic costs is the primary justification for expanding the existing pits. This obvious rationale is not properly presented in the EA.
- ERWM recommends expanding Table 3-2 using miles traveled between no action (off-site borrow sources) and proposed, plus the cost of developing new outside sources or hauling from existing off-site sources.

The following are comments provided by ERWM Cultural Resources:

- The Nez Perce Tribe, Hanford Cultural Resource (HCR) staff, received the cultural review on January 2, 2013, yet according to the NEPA document all cultural reviews have been completed. The 30 day review process for this borrow pit 36 is not complete
- Project 2012-100-024 the NEPA document acknowledges the site is visible from the TCP (Mooli, Mooli). Section 3.1 refers to mitigation measures, and states “significant adverse impacts to visual resources are not anticipated”. To ERWM’s knowledge, there has been no consultation as to the significance of impacts from this project. DOE needs to consult with the Hanford tribes on this matter.
- The NEPA review indicates a proposed action for the expansion of N-Area Borrow pit. This is listed separate from the new Borrow 36. HCR was not aware this was to be part of this NEPA review. The report for this expansion was done under NPCE 2011-100-011. It was ERWM’s understanding NPCE reports were not going to be used. This project requires a full Cultural review. This project is within the view shed of a TCP and should be addressed accordingly. The NPCE report was finalized without Tribal consultation and is inadequate. HCR requested consultation on this project due to potential adverse effects to the Mooli Mooli TCP. This should never have been a NPCE.
- The expansion of Borrow Pit 18 was covered under HCRC 2006-600-010. This review is 7 years old. This Cultural Resource Review should be updated to reflect current conditions. The borrow pit activity reflects extreme ground disturbance and should be reviewed for cultural resources accordingly.
- The expansion of Borrow 24 has some issues. HCR never concurred with this project and there was some discussion about a separate MOA. Rob Whitlam agreed at the time that it should be considered. The expansion does not connect with the current borrow pit. HCR would like further consultation on this Borrow Pit Expansion, which should include Hanford Tribes and SHPO, as the CTUIR had also requested a separate MOA. We are not sure this issue was ever resolved as consultation on this project ended. The Cultural Review for Pit 30 was done under NPCE 2008-600-014. Please see comments above with regards to the use of NPCE project reviews. This project requires a complete cultural review.
- Project 2012-100-023 concerns are in regards to the proximity to the TCP, Mooli Mooli. Hanford Affected Tribes requested further discussion with DOE. Presently this has not happened; the Cultural review for this project should not be deemed complete.
- On October 15, 2012 SHPO retracted their concurrence on the project, 2012-600-037; therefore, this cultural review should not be considered complete.
- The cultural review for Borrow Area F was performed under HCRC 2003-100-001 and is 10 years old. The Cultural Resource Review should be updated and re-submitted.
- The NEPA document shows all the cultural work has been completed for the expansion of each borrow pit; however there is non-concurrence on a number of projects.
- The Section 106 reviews should have been thoroughly completed prior to the EA. Though the draft NEPA document went out for public review stating cultural reviews are complete. A thorough accurate and complete analysis with complete information from the cultural reviews should have gone into the EA. Information gathered from Section 106 process was to be used to ensure compliance with NEPA. Thus far the Section 106 cultural reviews are either not completed, inadequate with the use of NPCEs, or in need of additional consultation with the affected tribe’s cultural resource programs.

Appendix C

DOE RESPONSE

Unlike EISs (40 CFR 1502.10) CEQ regulations do not prescribe the organization of an EA, CEQ regulation (40 CFR 1508.9 Environmental assessment) does state the following:

"Environmental assessment":

(a) Means a concise public document for which a Federal agency is responsible that serves to:

1. Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
2. Aid an agency's compliance with the Act when no environmental impact statement is necessary.
3. Facilitate preparation of a statement when one is necessary.

(b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

DOE believes that this EA contains the pertinent elements needed to support such a determination. The EA is formatted in a way that DOE believes is as straightforward as possible, given the nature of the proposed action. The resources potentially impacted by the proposed action are presented by pit in Section 4, and impacts are described in Section 5. Cumulative effects were strengthened by more quantification of impacts in the final EA.

Consistent with CEQ guidance, this EA incorporates information from other analyses by reference such as other NEPA documents and Hanford Site management plans. A number of references have been added to the final EA (Section 8). A mitigation action plan (MAP) has been prepared to document the mitigation actions identified in the EA.

Language to clarify the need for additional borrow material has been added to Section 3.1 of the EA, and also appears in Section 5.1. The quantity of material identified reflects the current reasonably foreseeable needs for sand and gravel to support ongoing remediation of the Hanford Site. Unexpected chromate spill soil removal volume in the 100 Areas was largely responsible for the underestimation of the foreseeable volumes in the previous EAs. Expertise and past experience performing cleanup, construction and maintenance tasks on the Hanford Site, and design information if available, were used to produce estimates of the borrow material quantities. GIS technology was used to convert the quantities to a geographic image and to estimate the acreage that will be affected at each pit (Appendix A). Volumes were estimated on a pit-specific basis based on the reasonably foreseeable needs for projects planned nearby. With the experience gained to date the quantity of material identified in this EA better reflects the reasonably foreseeable needs for sand and gravel to support ongoing remediation of the Hanford Site.

The remedial and support actions that DOE takes to clean up contamination are largely identified in Tri-Party Agreement decisions such as CERCLA Records of Decision (RODs), Action Memoranda, and Explanations of Significant Differences. The proposed action would support the projected needs based on current remedial and removal action decisions and the estimated volumes needed to fulfill the requirements in those decision documents. These decision documents can be accessed through the Administrative Record and Public Information Repository (<http://www.hanford.gov/page.cfm/OfficialDocuments>), along with the CERCLA Five-Year Review reports, which list the decision documents for each Hanford Site Operable Unit.

Language to clarify and further describe some of the best management practices in place at the Hanford Site regarding groundwater protection has been added to the proposed action and mitigation action plan. These measures include: use of water supplies authorized for discharge to ground, monitoring the use of dust suppression water to minimize ponding, implementation of spill prevention programs, and using administrative controls to keep equipment out of groundwater in the event it is encountered.

The total acres of the area impacted by the Proposed Action has been added to Table 3-1.

Information was added to the EA regarding additional costs anticipated as a result of implementation of the No-Action Alternative. These additional costs are a consequence of factors such as increased use of fuel, wear-and-tear on roads and vehicles, and operational costs associated with protracted cleanup schedules. The potential use of an offsite borrow source was considered in the draft EA as part of the No-Action Alternative, Section 3.2.1. Use of an offsite borrow source was not carried forward in the final EA because such a scenario is believed to be not reasonable based upon availability of onsite material and projected needs.

Language to identify the use of dust suppression measures (e.g., water spraying) during excavating, loading, unloading, and transporting of borrow pit materials and on topsoil stockpiles as needed was added to the EA and is also described in the MAP. The exact locations of the topsoil stockpiles are not known at this time, but are generally described in terms of orientation to the pits (i.e., north, south, east, west) and often serve a dual purpose of screening the pits from TCP viewpoints.

The majority of impacts from the Proposed Action are temporary. Mitigation actions are provided for impacts from the proposed action that are not considered temporary. As noted in Section 5.1 of the EA, the assessment concluded that there would be no net gain, loss, or degradation of the geologic materials on the Hanford Site, because the borrow material would be used to replace materials that were contaminated and were removed during remediation to a location on the Hanford Site.

A list of the meetings held for the purposes of consultation with Tribes has been added to Section 7 of the EA.

Details and timelines outside of the commitments made in the MAP for the eventual restoration of borrow areas will be addressed at a future date in accordance with Hanford Site Management

Appendix C

Plans and DOE regulations (10 CFR 1021.331 Mitigation action plans: (c) Each Mitigation Action Plan shall be as complete as possible, commensurate with the information available regarding the course of action either directed by the ROD or the action to be covered by the FONSI, as appropriate. DOE may revise the Plan as more specific and detailed information becomes available.)

Regarding air quality impacts and worker safety, the removal and handling of materials would be consistent with commercial industrial quarry activities, along with dust suppression practices widely used on the Hanford Site, as noted in Section 5.1.1 of the EA. The use of appropriate personal protective clothing, specific training, and equipment safeguards would be implemented for the safety of workers during recovery and handling of this material.

The EA was a draft document at the time this comment was received. All Section 106 reviews needed to support a NEPA decision were anticipated to have been completed prior to the approval of the NEPA action. In the case of Pit 36, however, consulting parties raised concerns regarding potential effects to the TCP, *Mooli Mooli* during the Section 106 30-day review period and during the EA comment period. Because of these concerns and to allow for their resolution, DOE continues to consult on Pit 36.

This area was entirely surveyed for cultural resources under *Fiscal Year 1991 Report on Archaeological Surveys of the 100 Areas (HCRC#91-100- CERCLA)*. A portion of the proposed action location was surveyed under *Cultural Resources Review for Group 5, 100 K Remedial Action-Backfill (HCRC#97-100-013g)*. No historic properties or cultural resources were identified during these survey or reviews. The *No Potential to Cause Effects (NPCE) Cultural Resources Review for the Ten Percent Expansion of the Borrow Pit at the 100-N Area (NPCE#2011-100-011)* for the expansion area was written using information from previously consulted cultural resource reviews under Section 106.

With respect to potential impacts to views from the *Mooli Mooli* TCP, the EA has been revised to address that between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the *Mooli Mooli* TCP was submitted to the DOE. The new boundary encompasses the 100-N borrow pit proposed action location. Actions that would minimize impacts to the view from the *Mooli Mooli* TCP are part of the proposed action and are described in Section 3.1 of the EA. Such actions would include berming the topsoil from the expansion area on the north, east, and south sides of the 100-N borrow pit expansion. Additionally, upon borrow pit closure, the 100-N borrow pit will be contoured and revegetated to blend with the surrounding terrain.

Pit 18 is included in this EA for the purpose of documenting the existing lateral expansion of the current disturbed area and no additional lateral expansion is planned. Continued use of Pit 18 is anticipated and it would include removal of material to a greater depth without lateral surface expansion. Inclusion of Pit 18 in this EA helps to ensure that future use would be managed within the authorized boundaries and that current borrow pit operational, mitigation, and closure requirements would be followed. Any future lateral expansion of this pit may require additional evaluation under NEPA and NHPA.

Appendix C

The Pit 24 proposed action location was reviewed and surveyed for cultural resources under *Cultural Resources Review for the Expansion of the Borrow Pit 24 in the 100 B/C Area of the Hanford Site, Benton County, Washington* (HCRC#2011-100-057). The finding of this cultural resources review was No Adverse Effect to Historic Properties and no MOA was required. No new cultural resources were identified during the survey. One previously identified pre-Hanford farmstead is located within the Pit 24 Proposed Action location as part of *Cultural Resources Review for the Pit 24 Borrow Expansion* HCRC#98-600-005 and HCRC#98-600-005a. This farmstead was determined eligible to the National Register of Historic Places (NRHP). The Washington State Department of Archaeology and Historic Preservation signed the “Memorandum of Agreement for Mitigation of the Fry and Conforth Farm (HT-95-050)” (Griffith 1998); the Advisory Council on Historic Preservation signed the “Memorandum of Agreement Regarding the Expansion of Gravel Pit 24, Hanford Site, WA” (Crisler 1998). The current borrow pit and the proposed expansion are only separated by the haul road and are connected by location, biology and geomorphology.

The proposed action locations were surveyed for cultural resources under *Cultural Resources Review of Retrieval, Treatment and Disposal of Tank Waste and Closure of Single Shell Tanks (Tank Closure) Environmental Impact Statement (EIS)* (HCRC# 2003-200-044), *Expansion of Gravel Pits 23 and 30 Project, A Cultural Resources Inventory Report* (HCRC#93-600-002), and *Cultural Resources Report Narrative: Spent Nuclear Fuel Storage Facility* (HCRC#94-600-042). The Pit 30 proposed action location was cleared under an NPCE in February 2008. No historic properties or cultural resources were identified during these surveys or reviews.

Between issuance of the draft EA for public comment and the development of the final EA, a new boundary for the *Mooli Mooli* TCP was submitted to the DOE. The new boundary is in proximity to Pit 21. Actions that would minimize impacts to visual resources are part of the proposed action and are described in Section 3.1 of this EA. Adverse impacts to the *Mooli Mooli* TCP visual resources will be mitigated by berming the topsoil from the expansion area on the south side of the Pit 21 expansion.

The F Pit is included in this EA for the purpose of documenting the existing lateral expansion of the current disturbed area, and no additional lateral expansion is planned. Continued use of F Pit is anticipated and it would include removal of material to a greater depth without lateral surface expansion. Inclusion of F Pit in this EA helps to ensure that future use would be managed within the authorized boundaries under the Environmental Management System, and that current borrow pit operational, mitigation, and closure requirements would be followed. Any future lateral expansion of this pit may require additional evaluation under NEPA and NHPA.

The SHPO concurrence was not retracted for Pit 6 (HCRC#2012-600-037).

Comment:

-----Original Message-----

From: Barbara Ekstrom [REDACTED]
Sent: Monday, December 17, 2012 4:45 PM
To: ^Borrow Area EA
Subject: Review of Proposed Borrow Pit Expansions

Although I retired from the Site a couple of years ago, I could not resist performing a review of the document. Having been the primary oversight person for many years and having the responsibilities for safety and operations efficiency of the borrow pits, the temptation to review was overwhelming. The article in the TCH and article references made it very easy for me to access and review.

I found the strategies described in the proposal to be consistent with our previous reviews, plans, and recommendations. In my previous day to day operations and future planning, I relied heavily on input by the "hands-on" guys and safety professionals, both on-Site and off-Site subcontractors, and it appears that the plan is continuing to use input from many of these same professionals.

It is great to see that MSA, DOE, and the other Site prime contractors are following a "common sense" fiscal and safe approach to completing the cleanup activities.

Kevin Ekstrom

DOE Response: Thank you for your comment.

Comment:

From: Haver Jim [REDACTED]
Sent: Tuesday, December 18, 2012 1:24 AM
To: ^Borrow Area EA
Subject: new admendment to borrow sights

I have a question, what do you fill the borrow with?

DOE Response: The borrow areas will not be back-filled. After borrow materials are exhausted within a particular pit, slopes will be recontoured to blend with adjacent areas in a pattern that would support healthy establishment of native communities. Closure of pits would include revegetation in accordance with applicable Hanford Site management plans. A slope model of 4:1 was used to calculate borrow material quantities for each pit and would be utilized to provide stable slopes during excavations.

Comment:

From: Sue Johns [REDACTED]
Sent: Sunday, December 16, 2012 8:14 AM
To: ^Borrow Area EA
Subject: Expansion of borrow areas

This deals with my primary problem with the cleanup. There are far more important things to do than fill holes. Moving material cost money that could be spent on other remediations. You have made it so complex to do anything that the stabilization of the whole site gets lost in the bureaucracy. Even with my limited knowledge of the entire site I could come up with more important projects for the dollars spent satisfying a reclamation plan. As a civil engineer I love moving material but what I say is leave the holes alone. Fill or recontour them later after more pressing projects have been completed.

Bill Johns
12608 s scribner road
cheney, washington 99004

DOE Response: DOE's proposed action supports decisions made under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)* which include the activity of backfilling the excavation left by removal of hazardous substances. The remedy in decision documents containing the requirements for cleanup (e.g., Records of Decision, Action Memoranda, Explanation of Significant Differences) lists backfill as one of four main tasks that must be performed:

- Remove contaminated soil, structures, and associated debris
- Treat these wastes as required to meet ERDF requirements
- Dispose of contaminated materials at the Hanford Site's ERDF
- Backfill excavated areas with clean material and revegetate the areas.

