APPENDIX H.9

IDF (CP-OP-7, CENTRAL PLATEAU)
EVALUATION UNIT SUMMARY TEMPLATE

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PART I. EXECUTIVE SUMMARY

EU LOCATION

The Hanford Integrated Disposal Facility (IDF) is a low-level and mixed low-level waste landfill located in the south-central part of the 200-East Area in the Hanford Central Plateau.

RELATED EUS

Not Applicable

PRIMARY CONTAMINANTS, CONTAMINATED MEDIA AND WASTES

The IDF will receive low-level waste (LLW) and mixed low-level waste (MLLW) that will be generated by the Waste Treatment and Immobilization Plant (WTP) as a result of the treatment processes (e.g., initially vitrification) (RPP-ENV-58562, Rev. 2). The WTP is not yet operating and no waste has been emplaced in the IDF to date. Anticipated IDF waste streams include:

- Immobilized Low-Activity Waste (ILAW) glass[1]
- Low-Activity Waste (LAW) melters
- Secondary Solid Waste[2]
- Effluent Treatment Facility (ETF)-generated secondary solid waste.

Additional waste streams are also expected to be disposed of at IDF that will not be a result of the WTP process. These additional waste streams include:

- Fast Flux Test Facility (FFTF) decommissioning waste
- Secondary waste management LLW and MLLW
- Onsite Non-Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) non-tank LLW and MLLW.

The primary contaminants listed in the Draft IDF Inventory Summary (RPP-ENV-58562, Rev. 2, Tables 10-1 and 10-2) for the CP-OP-7 EU include:[3]

[1] The selection process for the Supplemental LAW treatment process is currently underway and could, like Secondary solid waste, use a cementitious waste form for a significant amount of the low activity fraction of tank waste at the Hanford Site. However, this option was not considered in the development of the inventory used in this evaluation. It is considered unlikely that the selection of a cementitious waste form would have an order-of-magnitude impact on the results of the evaluation in this Appendix where the rough-order-of-magnitude metric is that posed for the Risk Review (CRESP 2015a).

[2] Hanford secondary waste includes a wide variety of waste: failed or replaced equipment, decontamination, protective clothing, and HEPA filters from common sources; evaporator condensate from tank farms; and routine solid waste, special case solid wastes (e.g., failed melters), and (solidified) liquid wastes from waste treatment facilities. (http://www.hanford.gov/files.cfm/EducationalForumSlides.pdf)

- *Radionuclides*: C-14, Cs-137/Ba-137m, tritium (H-3), I-129, Sr-90/Y-90, Tc-99, U-All isotopes, and Pu-All isotopes
- *Chemicals*: Cr/Cr-VI, Hg, nitrate (NO_3), Pb, and U-Total

BRIEF NARRATIVE DESCRIPTION

The Final Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS) (DOE/EIS-0391 2012) investigated alternatives for disposing of low-level waste, mixed low-level waste, immobilized low-activity waste, and WTP melters (RPP-20691, Rev. 1). The streams considered included tank closure activity waste; onsite non-CERCLA, non-tank-activity wastes; and offsite waste (RPP-20691, Rev. 1). One part of the preferred remedial alternative is to dispose of newly generated quantities of these waste forms in the IDF.

The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). The IDF site was analyzed in the Hanford Immobilized Low-Activity Waste Performance Assessment (ILAW PA): 2001 Version (DOE/ORP-2000-24). The IDF design is a double-lined landfill approximately 410 m wide by up to 13.2 m deep where the length of the trench will be expanded to accommodate waste receipts during operations. Furthermore, the landfill will be divided lengthwise into two separate cells, one for low-level radioactive waste and the other for mixed waste. Current plans place the mixed low-level and immobilized low-activity wastes and used melters in the western-most cell and the low-level waste in the eastern-most cell. The current closure plan is to cover the IDF with a modified RCRA Subtitle C barrier (RPP-20691, Rev. 1) and will be in accordance with DOE O 435.1 and *Washington Administrative Code* (WAC) requirements (RPP-ENV-58427, Rev. 0, p. 1-2).

SUMMARY TABLES OF RISKS AND POTENTIAL IMPACTS TO RECEPTORS

Table H.9-1 provides a summary of nuclear and industrial safety related risks to humans and impacts to important physical Hanford site resources.

Human Health

A Facility Worker is deemed to be an individual located anywhere within the physical boundaries of the Integrated Disposal Facility Area (CP-OP-7); a Co-located Person (CP) is an individual located 100 meters from the physical boundaries of the IDF area; and Public is an individual located at the closest point on the Hanford Site boundary not subject to DOE access control. The nuclear-related risks to humans are based on unmitigated (unprotected or controlled conditions) dose exposures expressed in a range of from *Not Discernible* (*ND*) to *High*. The estimated mitigated exposure that takes engineered and administrative controls and protections into consideration, is shown in parentheses.

[3] For radionuclides, those are listed if the total activity from the Draft IDF Inventory Summary (RPP-ENV-58562, Rev. 2, Table 10-1) exceeds 0.1 Ci or if they are listed in Table 6.1 (CRESP 2015a) and have a non-zero total activity. Unlike for the Interim Report (CRESP 2015b), the activities for all available uranium and plutonium isotopes were summed. For chemicals of potential concern, those are listed if the total mass from the Draft IDF Inventory Summary (RPP-ENV-58562, Rev. 2, Table 10-2) exceeds 1 kg or if they are listed in Table 6.1 (CRESP 2015a) and have a non-zero total mass. These are considered, for the purpose of this Review, the expected inventories before IDF closure. No waste has been emplaced in the IDF to date.

Groundwater and Columbia River

Direct impacts to protected resources, including groundwater and the Columbia River, have been rated based on available information for the current status and estimates for future time periods. These impacts are also expressed in a range of from *Not Discernible* (*ND*) to *Very High*.

Ecological Resources

The risk ratings are based on the degree of physical disruption (and potential additional exposure to contaminants) in the current status and as a potential result of remediation options.

Cultural Resources

No risk ratings are provided for Cultural Resources. The Table identifies the three overlapping Cultural Resource landscapes that have been evaluated: Native American (approximately 10,000 years ago to the present); Pre-Hanford Era (1805 to 1943) and Manhattan/Cold War Era (1943 to 1990); and provides initial information on whether an impact (both direct and indirect) is KNOWN (presence of cultural resources established), UNKNOWN (uncertainty about presence of cultural resources), or NONE (no cultural resources present) based on written or oral documentation gathered on the entire EU and buffer area. Direct impacts include but are not limited to physical destruction (all or part) or alteration such as diminished integrity. Indirect impacts include but are not limited to the introduction of visual, atmospheric, or audible elements that diminish the cultural resource's significant historic features. Impacts to Cultural Resources as a result of proposed future cleanup activities will be evaluated in depth under Section 106 of the National Historic Preservation Act (16 USC 470, et. seq.) during the planning for remedial action.

Table H.9-1. Risk Rating Summary (for Human Health, unmitigated nuclear safety basis indicated, mitigated basis indicated in parentheses (e.g., "Very High" (Low)).

Population or Resource		Evaluation Time Period: Active Cleanup (to 2064)	
		Current Condition: Ready-to-serve status	**From Cleanup Actions:** Operations and Closure / D&D
Human Health	Facility Worker	***Not Discernible (ND)*** *(ND)*	***Operations***: *ND-Low* (*ND-Low*) ***Closure /D&D***: *IS*[d] (*IS*)
	Co-located Person	***ND*** *(ND)*	***Operations***: *ND-Low* (*ND-Low*) ***Closure /D&D***: *IS* (*IS*)
	Public	***ND*** *(ND)*	***ND*** *(ND)*
Environmental	Groundwater (A&B) from vadose zone[a]	*ND* – all Group A&B PCs	*ND* – all Group A&B PCs
	Columbia River from vadose zone[a]	Benthic and Riparian: *ND* Free-flowing: *ND* **Overall**: *ND*	Benthic and Riparian: *ND* Free-flowing: *ND* **Overall**: *ND*
	Ecological Resources[b]	ND	Estimated to be ND to Low[c]
Social	Cultural Resources[b]	**Native American** Direct: Known Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: None Indirect: Known	Estimated to be: [c] **Native American** Direct: Known Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: None Indirect: Known

a. Threat to protected resources (i.e., groundwater and Columbia River) from Group A and B primary contaminants (PCs) (Table 6-1, CRESP 2015a) remaining in the vadose zone. Because no waste has been emplaced in the IDF, there is no current threat from any IDF contaminants to protected resources. For the Active Cleanup period, wastes will be emplaced in a double-lined landfill with RCRA-complaint leachate collection with plans to cover the landfill with a modified RCRA Subtitle C barrier. Thus there are no foreseeable threats to protected resources during the Active Cleanup period.

b. For both Ecological and Cultural Resources see Appendices J and K, respectively, for a complete description of Ecological Field Assessments and literature review for Cultural Resources. Ecological ratings are described in Table 4-11 of the Final Report.

c. No final cleanup and closure plans have been made for this EU.

d. Insufficient information

SUPPORT FOR RISK AND IMPACT RATINGS FOR EACH POPULATION OR RESOURCE HUMAN HEALTH

Current

When the IDF is in operation, hazards would potentially include industrial hazards, hazardous materials, radiological materials, radioactive and/or mixed waste, and physical hazards (HNF-39904, Rev. 4). However, because the IDF is currently in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1), no waste is being emplaced in the facility and thus the only risks to workers is from industrial risks (i.e., "slips, trips, and falls") related to characterization and monitoring activities. The workforce involved with characterization activities (denoted a Facility worker) would thus have an unmitigated *Not Discernible* (*ND*) risk rating (as described in **Part VI**). Risk to the Co-located Person (who is not in or near the contaminated soil) would also be rated *ND.* The Public is rated as *ND* due to the remote distance to the site that has no waste emplaced.

Unmitigated Consequences: Facility Worker – *ND*, CP – *ND*; Public – *ND*

Mitigation: The Department of Energy (DOE) and contractor site-specific safety and health planning that includes work control, fire protection, training, occupational safety and industrial hygiene, emergency preparedness and response, and management and organization—which are fully integrated with nuclear safety and radiological protection—have proven to be effective in reducing industrial accidents at the Hanford Site to well below that in private industry. Further, the safety and health program must effectively ensure that ongoing task-specific hazard analyses are conducted so that the selection of appropriate PPE can be made and modified as conditions warrant. Task-specific hazard analyses must lead to the development of written work planning documents and standard operating procedures (SOPs) that specify the controls necessary to safely perform each task, to include continuous employee exposure monitoring. Thus resulting Facility worker risks would remain rated as *ND*; ratings for others also remain the same.

Mitigated Consequences: Facility Worker – *ND*, CP – *ND*; Public – *ND*

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

The risks and potential impacts from IDF operations were considered *ND-Low* as described in **Part VI**. Closure and D&D risks and potential impacts will depend on final cleanup decisions and closure plans that have not been made and thus *insufficient information* (IS) is available to evaluate.

Unmitigated Risk: Facility Worker – *ND-Low* (Operations) and *IS* (Closure); CP – Same; Public – *ND*

Mitigation: See description in **Part VI**. Thus resulting worker and co-located person risks and potential impacts are not impacted (because they are already low).

Mitigated Risk: Facility Worker – *ND-Low* (Operations) and *IS* (Closure); CP – Same; Public – *ND*

Groundwater and Columbia River

Current

As described in **Part VI** and illustrated in Table H.9-5, the vadose zone (VZ) GTM values for the IDF Group A and B primary contaminants (PCs) remaining in the vadose are all *Not Discernible* (*ND*) because no wastes have been emplaced in the IDF to date. Thus the overall rating for the CP-OP-7 EU is *ND* for both groundwater and the Columbia River.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

Based on likely closure plans, there would appear to be no additional risks to protected resources (groundwater and the Columbia River) from operation and closure of the IDF, a double-lined landfill with RCRA-complaint leachate collection with plans to cover the landfill with a modified RCRA Subtitle 'C' barrier[4]. Thus a *Not Discernible* (*ND*) rating is given for the groundwater and Columbia River for the Active Cleanup period.

Ecological Resources

Current

3% of level 3 or greater in the EU and 46% of level 3 or greater resources in the buffer. The entire EU is surrounded by the 200 East Maintenance Waste Sites.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

No cleanup decisions have been made, and as a result, the potential effects of cleanup on ecological resources is uncertain for the active cleanup evaluation period.

Cultural Resources

Current

Much of the land within the EU is extensively disturbed. Small portions of the EU have been inventoried for cultural resources. Geomorphology indicates a low potential to contain intact archaeological resources on the surface and/or subsurface. Traditional cultural places are visible from EU. Three archaeological resources are located within the EU.

National Register eligible Manhattan Project/Cold War Era significant resources located within 500 meters of the EU will be demolished, but they have already been mitigated.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

The geomorphology indicates a low potential for intact archaeological resources. Remediation disturbance may result in impacts to archaeological resources if they are present in the subsurface. No cleanup decisions have been selected, however the potential range of impacts could include: Temporary indirect effects during remediation; Permanent indirect effects are possible if contamination remains after remediation.

National Register eligible Manhattan Project/Cold War Era significant resources located within 500 meters of the EU will be demolished, but they have already been mitigated.

Considerations for Timing of the Cleanup Actions

The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). After permitting and authorization is obtained, the IDF will receive LLW and MLLW that will be generated by the WTP (after it becomes operational) and additional waste streams not resulting from WTP operation. Closure of the IDF is dependent on the WTP and other

[4] Based on the information in the 2015 Hanford Annual Groundwater Report (DOE/RL-2016-09, Rev. 0) and PHOENIX (http://phoenix.pnnl.gov/apps/gisexplorer/index.html), there is a tritium (Group C) plume from 200-PO-1 Operable Unit (OU) that currently intersects the Columbia River at concentrations exceeding the appropriate water quality standard (WQS). However, because no waste has been emplaced in the IDF, this plume is not associated with the IDF.

waste sources that will be emplaced in the landfill and thus no estimate can be made of when the facility will no longer be in use.

Near-Term, Post-Cleanup Risks and Potential Impacts

Risks and potential impacts from the IDF will depend on final cleanup decisions as well as operating and closure plans that have not been made (DOE/RL-2014-11, Rev. 0, p. B-13).

PART II. ADMINISTRATIVE INFORMATION

OU AND/OR TSDF DESIGNATION(S)

CP-OP-7 EU. The *Operable Unit Cross-Walk* in Attachment 1 indicates that there are no related operable units.

COMMON NAME(S) FOR EU

Integrated Disposal Facility, IDF

KEY WORDS

Integrated Disposal Facility (IDF), 200-E-106 waste site, low-level waste (LLW), mixed low-level waste (MLLW)

REGULATORY STATUS:

Regulatory basis[5]

The TC&WM EIS (DOE/EIS-0391 2012) investigated alternatives for disposing of low-level waste, mixed low-level waste, immobilized low-activity waste, and WTP melters. The streams considered included tank closure activity waste; onsite non-CERCLA, non-tank-activity wastes; and offsite waste. One part of the preferred remedial alternative is to dispose of newly generated quantities of these waste forms in the IDF. The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE. The current closure plan is to cover the IDF with a modified RCRA Subtitle C barrier. No final cleanup decisions have not been made for the IDF (DOE/RL-2014-11, Rev. 0, p. B-13).

Applicable regulatory documentation

DOE/EIS-0391 2012, *Tank Farm Closure & Waste Management (TC&WM) Environmental Impact Statement*. U.S. Department of Energy, Richland, WA. Available at: http://www.hanford.gov/page.cfm/FinalTCWMEIS.

DOE/ORP-2000-24, *Hanford Immobilized Low-Activity Waste Performance Assessment: 2001 Version*, Department of Energy Office of River Protection, Richland, Washington.

Applicable Consent Decree or TPA milestones

There are no applicable TPA milestones specifically related to the IDF although there are milestones related to the Hanford waste tanks.

[5] The information in this section is taken from RPP-20691, Rev. 1.

RISK REVIEW EVALUATION INFORMATION

Completed

March 6, 2017

Evaluated by

Kevin G. Brown

Ratings/Impacts Reviewed by

James H. Clarke

PART III. SUMMARY DESCRIPTION

The Final TC&WM EIS (DOE/EIS-0391 2012) investigated alternatives for disposing of low-level waste, mixed low-level waste, immobilized low-activity waste, and WTP melters (RPP-20691, Rev. 1). One part of the preferred EIS remedial alternative is to dispose of newly generated quantities of these waste forms in the IDF. The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). The IDF site was analyzed in the Hanford ILAW PA: 2001 Version (DOE/ORP-2000-24). The IDF design is a double-lined landfill approximately 410 m wide by up to 13.2 m deep where the length of the trench will be increased to accommodate waste received during operations. Furthermore, the landfill will be divided lengthwise into two separate cells, one for low-level radioactive waste and the other for mixed low-level waste. Current plans would place the mixed low-level and immobilized low-activity wastes and used melters in the western-most cell and the low-level waste in the eastern-most cell. The current closure plan is to cover the IDF with a modified RCRA Subtitle C barrier (RPP-20691, Rev. 1). No final cleanup decisions have not been made for the IDF (DOE/RL-2014-11, Rev. 0, p. B-13).

CURRENT LAND USE

DOE Hanford Site for industrial use. All current land-use activities in the 200-East Area (where the IDF is located) are *industrial* in nature (EPA 2012).

DESIGNATED FUTURE LAND USE

Industrial-Exclusive. All four land-use scenarios listed in the Comprehensive Land Use Plan (CLUP) indicate that the 200-East Area is denoted *Industrial-Exclusive* (DOE/EIS-0222-F). An industrial-exclusive area is “suitable and desirable for treatment, storage, and disposal of hazardous, dangerous, radioactive, and nonradioactive wastes” (DOE/EIS-0222-F).

PRIMARY EU SOURCE COMPONENTS

Legacy Source Sites

Not Applicable

High-Level Waste Tanks and Ancillary Equipment

The single waste site (200-E-106) with a reported (albeit future) inventory (see Table H.9-2 through Table H.9-4) constitutes the primary source of contamination that is expected to reside in the CP-OP-7

EU. This site is not part of the Tank Waste and Farms EU; however, much of the waste that is planned to be emplaced in the IDF is single-shell tank waste that will be processed in the Hanford WTP via the double-shell tank (DST) system.

Groundwater Plumes

There are groundwater plumes (e.g., chromium, I-129, Sr-90, Tc-99, nitrates, tritium, and uranium) in the vicinity of the IDF based on 2014 groundwater monitoring results (http://phoenix.pnnl.gov/apps/gw/phoenix.html); however, none of the plumes are related to the IDF because no wastes have been emplaced in the site. Furthermore, because the IDF is a double-lined landfill with a RCRA-compliant leachate collection system, it is not anticipated that contamination from the IDF would impact Hanford Site groundwater (or the Columbia River) in the time period considered in this evaluation.

Operating Facilities

The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). The IDF design is a lined landfill approximately 410 m wide by up to 13.2 m deep where the length of the trench will be expanded to accommodate waste receipts during operations. Furthermore, the double-landfill will be divided lengthwise into two separate cells, one for low-level radioactive waste and the other for mixed waste. Current plans place the mixed low-level and immobilized low-activity wastes and used melters in the western-most cell and the low-level waste in the eastern-most cell.

The IDF will receive LLW and MLLW that will be generated by the WTP as a result of the treatment processes where anticipated IDF waste streams include (RPP-ENV-58562, Rev. 2):

- ILAW glass[6]-- Under current TC&WM EIS assumptions (DOE/EIS-0391 2012), all tank waste processed at WTP would result in an ILAW glass waste form that would be disposed of at IDF.
- LAW melters -- Spent and failed LAW melters from WTP operations are expected to be classified as MLLW and would be disposed of at IDF.
- Secondary solid waste -- Solid waste will be generated from WTP operations and will include LLW and MLLW radioactive debris, melter consumables, failed process components, analytical laboratory waste, spent resins, spent carbon adsorbent, high-efficiency particulate air filters, and other process-related waste that will be packaged and grouted before being transported to IDF for disposal.
- Effluent Treatment Facility (ETF)-generated secondary solid waste – These waste result from treating secondary liquid waste from WTP operations, including low-level and mixed low-level liquid effluent from the melter off-gas treatment systems, process vessel washes, floor drains and sumps, and vessel vent header drains. The liquid portion of the treated ETF waste stream would be disposed of at the State-Approved Land Disposal Site (SALDS) and the byproduct waste generated from the ETF solidification process would be packaged and disposed of at IDF.

[6] The selection process for the Supplemental LAW treatment process is currently underway and could, like Secondary solid waste, use a cementitious waste form for a significant amount of the low activity fraction of tank waste at the Hanford Site. However, this option was not considered in the development of the inventory used in this evaluation. It is considered unlikely that the selection of a cementitious waste form would have an order-of-magnitude impact on the results of the evaluation in this Appendix where the rough-order-of-magnitude metric is that posed for the Risk Review (CRESP 2015a).

Additional waste streams would also be disposed of at IDF that are not a result of the WTP process. These waste streams include (RPP-ENV-58562, Rev. 2):

- Fast Flux Test Facility (FFTF) decommissioning waste – The following wastes would be disposed of at IDF: remote-handled special components treated at Idaho National Laboratory and returned to Hanford; sodium residuals from FFTF components; and FFTF secondary wastes, including demolition waste from the main Reactor Containment Building and Buildings 491E and 491W that cannot be consolidated, radioactive and hazardous materials from other ancillary buildings, reactor vessel, piping systems, and drained tanks, solids waste from processing, and radioactive liquid waste resulting from treatment of sodium residuals after treatment.
- Secondary waste management LLW and MLLW – These wastes include personal protective equipment, tools, and other contaminated materials; secondary LLW and MLLW from operation of LLBG 218-W-5, trenches 31 and 34; secondary LLW and MLLW from operation of the Waste Receiving and Processing Facility (WRAP); and secondary LLW and MLLW from operation of the T Plant complex.
- Onsite Non-CERCLA non-tank LLW and MLLW – Specified wastes from onsite generators only, including the Central Waste Complex, Plutonium Finishing Plant, T Plant complex, Waste Encapsulation and Storage Facility, WRAP, Waste Sampling and Characterization Facility, groundwater sampling activities, Pacific Northwest National Laboratory, Cold Vacuum Drying Facility, Canister Storage Building, and Liquid Waste Processing Facilities (LERF, ETF, SALDS, and Treated Effluent Disposal Facility).

D&D of Inactive Facilities

Not Applicable

LOCATION AND LAYOUT MAPS

The IDF (Figure H.9-1) is located in the south-central part of 200-East Area on 25 hectares in an area southwest of the Plutonium-Uranium Extraction (PUREX) Plant (CP-DD-1 in Appendix F.6) (PNNL-15237). The elevation of the IDF site ranges is 219 to 222 m above mean sea level. The relative flatness of the IDF site suggests that the final site topography will be determined by surface cover and soil grading (PNNL-14744).

Figure H.9-1. CP-OP-7 (Integrated Disposal Facility) Site Location Map and Waste Site Location

The IDF trench design is a double-lined landfill approximately 410 m wide by up to 13.2 m deep where the length of the trench will be expanded to accommodate waste receipts during operations. The IDF was completed in 2005 (Figure H.9-2) and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). Furthermore, the landfill will be divided lengthwise into two separate cells (as shown in Figure H.9-3), one for low-level radioactive waste and the other for mixed waste. Figure H.9-4 provides cross-sections through the IDF trench illustrating the trench geometry.

Figure H.9-2. The Integrated Disposal Facility (IDF) Trench (reproduced from (RPP-20691, Rev. 1))

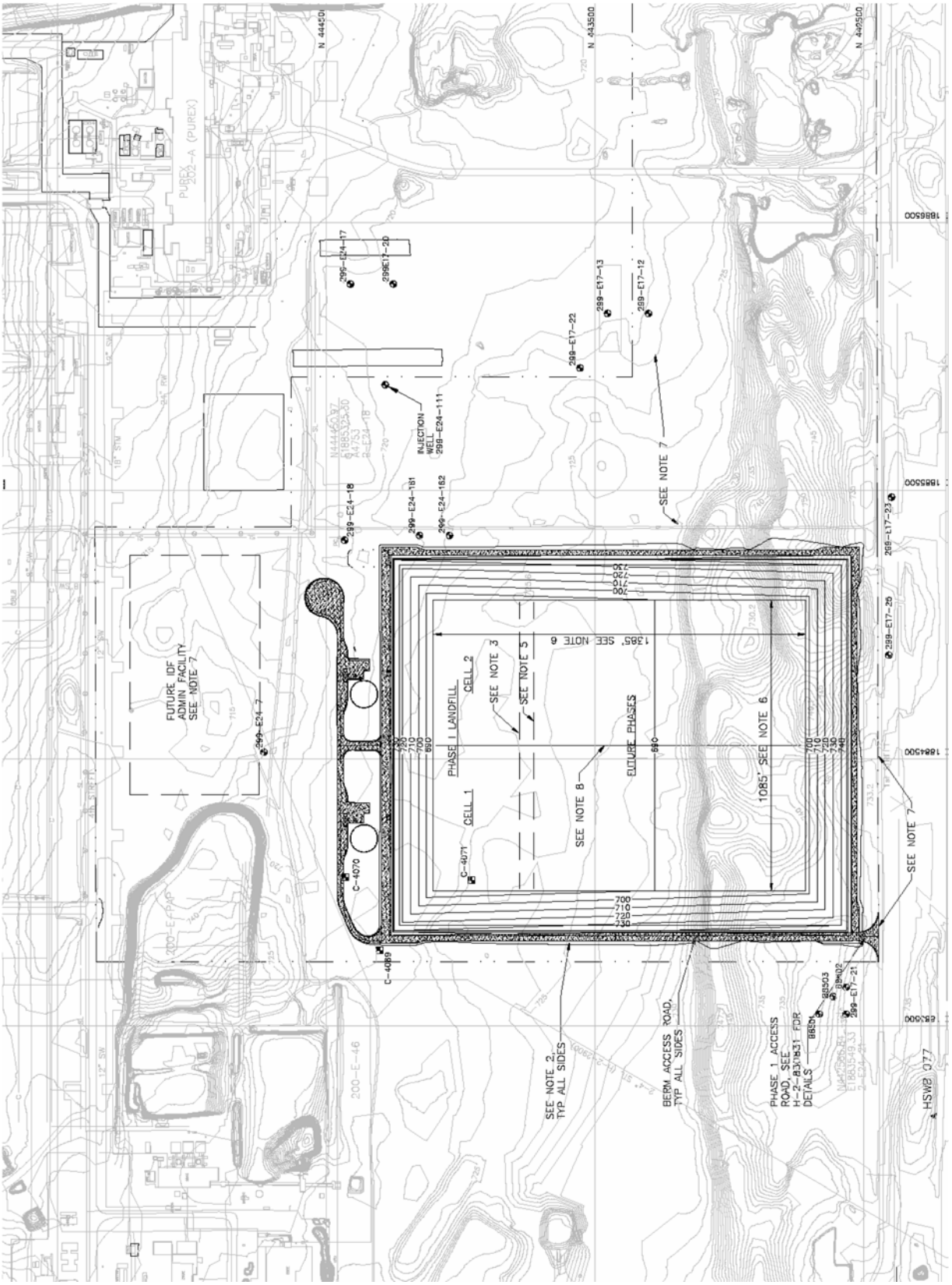

Figure H.9-3. Layout of the IDF Facility within the Hanford Site (from PNN-14700)

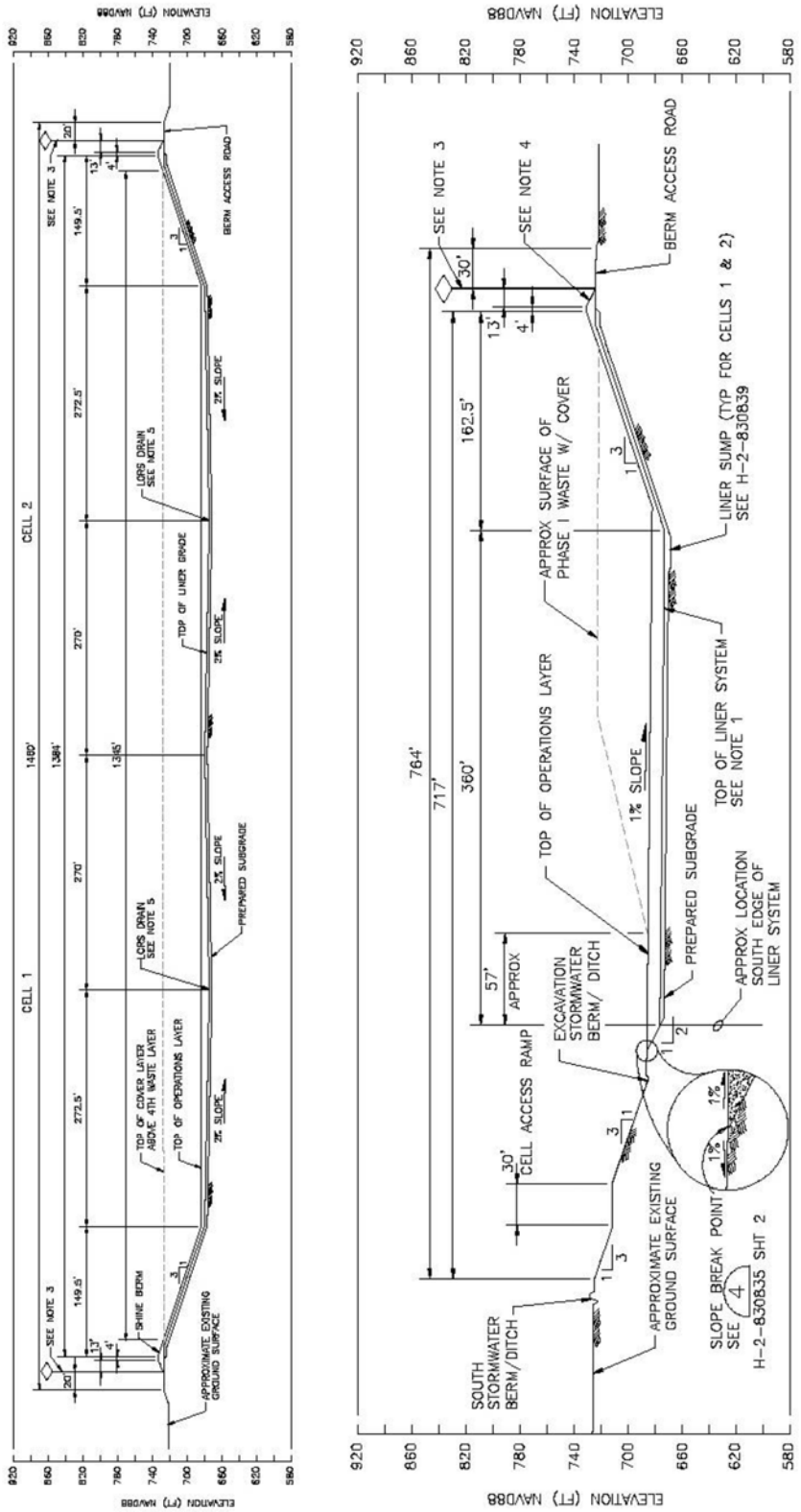

Figure H.9-4. East-West (left) and North-South (right) Cross-Sections through the IDF Trench (from PNNL-14700)

PART IV. UNIT DESCRIPTION AND HISTORY

EU FORMER/CURRENT USE(S)

The IDF has no former uses. The IDF currently consists of two disposal areas called cells, although the facility can be expanded to a total of six cells, if needed. As described in more detail in **Part III**, one of the existing cells is designed to accept MLLW from WTP processing and the second cell is being considered to accept LLW that has come from Hanford cleanup activities but not from WTP. The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). The IDF has accepted no waste to date.

LEGACY SOURCE SITES

Not Applicable

GROUNDWATER PLUMES

As indicated in **Part III**, there are groundwater plumes in the vicinity of the IDF; however, none of the plumes are associated with the IDF.

D&D OF INACTIVE FACILITIES

Not Applicable

OPERATING FACILITIES

The IDF has accepted no waste to date. More detailed information on the planned disposal activities can be found in **Part III** above.

ECOLOGICAL RESOURCES SETTING

Landscape Evaluation and Resource Classification

Nearly 70% of the IDF EU is classified as a level 0 resource, and level 0 and level 1 resources together comprise 97% of the land area within the EU. Level 2 and 3 habitat resources represent only 3% of the land area within the EU (Appendix J, Table J.97). Much of the level 1 habitat is covered by Russian thistle and is likely sprayed with herbicides. The 1.1-acre habitat classified as level 3 habitat has been disturbed previously during construction activities and although it has been revegetated, the habitat is of much lower quality than contiguous areas of level 3 habitat outside the IDF EU boundary.

The amount and proximity of biological resources surrounding the IDF EU were examined within the adjacent landscape buffer area, which extends 2026 ft (618 m) from the geometric center of the EU (Appendix J, Figure J.111). The buffer area occurs within the 200E Miscellaneous Waste Sites, BC Control Zone and PUREX Cribs, Ponds, and Trenches EUs and the summaries for these EUs provide more details on observed species and canopy cover.

The northwest and southeast portions of the buffer area consist of level 1 habitat that is contiguous with the level 0 and 1 habitats in the EU. Slightly more than 37% of the adjacent landscape buffer area is classified as level 3 habitat and dominated by climax shrubs (*Sandberg's bluegrass*) with a mixture of

cheatgrass, native grasses such as Sandberg's bluegrass (*Poa secunda*) and introduced and native forbs in the understory.

Field Survey

On June 8, 2015 PNNL ecologists performed a driving survey around the IDF EU. The IDF is a large flat pit kept free of vegetation. The area around the top of the pit was heavily disturbed during construction of the IDF and mostly kept free of vegetation. A band of introduced weedy species including Russian thistle (*Salsola tragus*), cheatgrass (*Bromus tectorum*) and Jim Hill mustard (*Sisymbrium altissimum*) surrounds the pit and extends toward less disturbed habitat beyond the EU boundary. Small patches of shrub-steppe are included at the margin of the EU (Appendix J, Figure J.111). The EU boundary on the west extends 33 ft (10 m) into degraded shrub-steppe habitat that includes introduced and native grasses (*Agropyron cristatum* and *Poa secunda*, respectively) as well as some of weedy species. Because nearly all of the IDF evaluation unit is composed of bare ground with no vegetation or very small amounts of introduced species (Appendix J, Table J.96), no estimates of percent cover were taken for the narrow bands of level 2 and level 3 habitat at the EU boundary.

CULTURAL RESOURCES SETTING

Three cultural resource inventory surveys cover small portions of the CP-OP-7, IDF EU. Three archaeological isolates (one associated with the Native American Precontact and Ethnographic Landscape, and 2 with the Pre-Hanford Early Settlers/Farming Landscape) have been documented within the EU. While these isolates have not been formally evaluated for listing in the National Register of Historic Places, it should be noted that isolates are typically considered not eligible. It is unknown if an NHPA Section 106 review has been completed specifically for the remediation of the CP-OP-7, IDF EU. Although not all of the EU has been inventoried for cultural resources, it is highly unlikely that intact archaeological material is present in the EU, which has been extensively disturbed by Hanford Site activities.

Cultural resources within 500 meters of the CP-OP-7 IDF EU include: Segments of the National Register-eligible Hanford Site Plant Railroad, a contributing property within the Manhattan Project and Cold War Era Historic District with documentation required. In addition 7 National Register-eligible buildings that are contributing properties within the Manhattan Project and Cold War Era Historic District are located within 500 meters of the EU (all 7 are contributing within the Manhattan Project and Cold War Era Historic District, 6 with individual documentation required, and 1 with no additional documentation required). All National-Register-eligible Manhattan Project and Cold War Era buildings have been documented as described in the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE-RL 1998).

Historic maps indicate a low potential for the presence of archaeological resources associated with the Pre-Hanford Early Settler/Farming Landscape within the EU. Geomorphology suggests a low potential for the presence of archaeological resources associated with the Native American Precontact and Ethnographic Landscape to be present within the CP-OP-7, IDF EU. Extensive ground disturbance within the EU suggests a very low potential for intact cultural resources at or below ground surface. Resources, if present, would likely be limited to areas of intact or undisturbed soils.

Because only small portions of the CP-OP-7, IDF EU have been inventoried for cultural resources, it may be appropriate to conduct surface archaeological investigations prior to the initiation of any remediation activities. Indirect effects are always possible when TCPs are known to be located in the general vicinity. Consultation with Hanford Tribes (Confederated Bands of the Yakama Nation, Wanapum, Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce) and other groups associated with these

landscapes (e.g. East Benton Historical Society, the Franklin County Historical Society and the Prosser Cemetery Association, the Reach, and the B-Reactor Museum Association) may be necessary to provide input on indirect effects to both recorded and potential unrecorded TCPs in the area and other cultural resource issues of concern.

PART V. WASTE AND CONTAMINATION INVENTORY

The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE (RPP-20691, Rev. 1). No waste has been accepted to date.

CONTAMINATION WITHIN PRIMARY EU SOURCE COMPONENTS

Operating Facilities

As mentioned above, no waste has been accepted at the IDF. The *planned* or expected inventory for the IDF was taken from the Draft Inventory Summary developed for the IDF PA (RPP-ENV-58562, Rev. 2). The total inventories from the *Current Operations Case* (Case 7) (PP-ENV-58562, Rev. 2, Table 10-1 and Table 10-2) are used to represent the future IDF inventories shown in Table H.9-2 through Table H.9-4. Note that the ILAW inventories are already (partially) represented in the single-shell (SST) and double-shell tank (DST) waste inventories described in the Tank and Waste Farms EU (Appendix E.1 through Appendix E.11).

Table H.9-2. Inventory of Primary Contaminants [a]

WIDS	Description	Decay Date	Ref	Am-241 (Ci)	C-14 (Ci)	Cl-36 (Ci)	Co-60 (Ci)	Cs-137 (Ci)	Eu-152 (Ci)	Eu-154 (Ci)	H-3 (Ci)	I-129 (Ci)
All	Sum			NR	530	NR	NR	120000	NR	NR	2.1	28
200-E-106[b]	Burial Ground	2008	RPP-ENV-58562, Rev. 2, Table 10-1	NR	530	NR	NR	120000	NR	NR	2.1	28

a. NR = Not reported for indicated EU

b. Inventories for 200-E-106 are future inventories based on Case 7 (IDF Totals) in RPP-ENV-58562, Rev. 2, Table 10-1 and double count inventories of low activity waste currently stored in Tank Waste and Farms EUs (Appendix E.1 through Appendix E.11).

Table H.9-3. Inventory of Primary Contaminants (cont)[a]

WIDS	Description	Decay Date	Ref	Ni-59 (Ci)	Ni-63 (Ci)	Pu (total) (Ci)	Sr-90 (Ci)	Tc-99 (Ci)	U (total) (Ci)
All	Sum			NR	NR	5500	260000	26000	13
200-E-106[b]	Burial Ground	2008	RPP-ENV-58562, Rev. 2, Table 10-1	NR	NR	5500	260000	26000	13

a. NR = Not reported for indicated EU

b. Inventories for 200-E-106 are future inventories based on Case 7 (IDF Totals) in RPP-ENV-58562, Rev. 2, Table 10-1 and double count inventories of low activity waste currently stored in Tank Waste and Farms EUs (Appendix E.1 through Appendix E.11).

Table H.9-4. Inventory of Primary Contaminants (cont)[a]

WIDS	Description	Ref	CCl4 (kg)	CN (kg)	Cr (kg)	Cr-VI (kg)	Hg (kg)	NO3 (kg)	Pb (kg)	TBP (kg)	TCE (kg)	U (total) (kg)
All	Sum		NR	NR	490000	NR	2000	150000	80000	NR	NR	6800
200-E-106[b]	Burial Ground	RPP-ENV-58562, Rev. 2, Table 10-1	NR	NR	490000	NR	2000	150000	80000	NR	NR	6800

a. NR = Not reported for indicated EU

b. Inventories for 200-E-106 are future inventories based on Case 7 (IDF Totals) in RPP-ENV-58562, Rev. 2, Table 10-2 and double count inventories of low activity waste currently stored in Tank Waste and Farms EUs (Appendix E.1 through Appendix E.11).

Table H.9-5. Summary of the Evaluation of Current Threats to Groundwater as a Protected Resource from Saturated Zone (SZ) and Remaining Vadose Zone (VZ) Contamination associated with the Evaluation Unit

PC	Group	WQS	Porosity[a]	K_d (mL/g)[a]	ρ (kg/L)[a]	VZ Source M^{Source}	SZ Total M^{SZ}	Treated[c] M^{Treat}	VZ Remaining M^{Tot}	VZ GTM (Mm^3)	VZ Rating[d]
C-14	A	2000 pCi/L	0.25	0	1.82	---	---	---	---	---	*ND*
I-129	A	1 pCi/L	0.25	0.2	1.82	---	---	---	---	---	*ND*
Sr-90	B	8 pCi/L	0.25	22	1.82	---	---	---	---	---	*ND*
Tc-99	A	900 pCi/L	0.25	0	1.82	---	---	---	---	---	*ND*
CCl4	A	5 µg/L	0.25	0	1.82	---	---	---	---	---	*ND*
Cr	B	100 µg/L	0.25	0	1.82	---	---	---	---	---	*ND*
Cr-VI	A	48 µg/L[b]	0.25	0	1.82	---	---	---	---	---	*ND*
TCE	B	5 µg/L	0.25	2	1.82	---	---	---	---	---	*ND*
U(tot)	B	30 µg/L	0.25	0.8	1.82	---	---	---	---	---	*ND*

a. Parameters obtained from the analysis provided in Attachment 6-1 to Methodology Report (CRESP 2015a).

b. "Model Toxics Control Act—Cleanup" (WAC 173‑340) Method B groundwater cleanup level for hexavalent chromium.

c. Treatment amounts from the 2015 Hanford Annual Groundwater Report (DOE/RL-2016-09, Rev. 0).

d. Groundwater Threat Metric rating based on Table 6-3, Methodology Report (CRESP 2015a).

PART VI. POTENTIAL RISK/IMPACT PATHWAYS AND EVENTS

CURRENT CONCEPTUAL MODEL

Pathways and Barriers

Briefly describe the current institutional, engineered and natural barriers that prevent release or dispersion of contamination, risk to human health and impacts to resources:

1. What nuclear and non-nuclear safety accident scenarios dominate risk at the facility? What are the response times associated with each postulated scenario?

A Hazards and Operability Study (HAZOP) (AIChE 1992) was used to identify causes and consequences of potential off-normal conditions associated with IDF operations (RPP-19337, Rev. 0). One important part of the HAZOP process is the division of a process or activity into discrete elements denoted nodes where node selection facilitates the hazard identification process by focusing attention on specific process sections or operating steps. The IDF HAZOP was based on the following nodes (RPP-19337, Rev. 0):

1. Transporter drives to ramp access point and stops for paperwork
2. Transporter drives to unloading point
3. (At unloading point) tractor is unhooked from trailer, hooked to empty trailer, and driven away
4. Shipping cask uncovered to prepare for package movement (includes surveys, etc.)
5. Crane attached to package
6. Crane lifts package and booms to placement position
7. Crane detached from package
8. Crane attached to earth-moving hopper
9. Earth-moving hopper loaded with backfill material, crane picks up hopper, booms to backfill location, and dumps backfill material
10. Earthmoving equipment covers backfilled packages with soil
11. Natural phenomena hazards, including earthquakes, range fires, tornados/high winds, and lightning
12. External events
13. Events related to waste package internal conditions
14. Construction, operation, maintenance
15. Leachate management

The results of the hazard evaluation indicated that there appear to be no offsite public or onsite worker Risk Bin I or II hazardous conditions[7] associated with IDF operations. There are hazardous conditions

[7] Safety structures, systems, and components (SSCs) and/or technical safety requirement-level (TSR) controls are required for accidents or hazardous conditions that are assigned to Risk Bin I (Unlikely to Anticipated Event

with potentially significant facility worker consequences; however, it is expected that the existing DOE safety management programs will address these issues.

2. What are the active safety class and safety significant systems and controls?

The low onsite and offsite consequences indicate that no safety class or safety significant structures, systems, and components (SSCs) are required for onsite worker or offsite public exposure (RPP-19337, Rev. 0, p. 5-1). This includes both active and passive SSCs.

3. What are the passive safety class and safety significant systems and controls?

As indicated above, no safety class or safety significant SSCs are required for the IDF. This includes both active and passive SSCs.

4. What are the current barriers to release or dispersion of contamination from the primary facility? What is the integrity of each of these barriers? Are there completed pathways to receptors or are such pathways likely to be completed during the evaluation period?

The IDF will be constructed as a double-lined trench initially with two disposal cells for waste packages and other waste forms and room for expansion (PNNL-14700, p. 8). Prior to closure, a protective surface cover (modified RCRA Subtitle C Barrier Design) will be constructed over the trench to provide a barrier to vertical water flow, and components of the cover will serve as an inadvertent intruder barrier. There are no current completed pathways to receptors (because no waste has been emplaced), and there are unlikely to be completed pathways during the evaluation period considered in this Review because of the nature of the IDF design.

5. What forms of initiating events may lead to degradation or failure of each of the barriers?

A seismic event (earthquake) can expose or degrade the liner, operational accidents (drop, vehicle overturn, etc.) and can impact waste packages (and perhaps release contamination), and fire can impact the cover.

6. What are the primary pathways and populations or resources at risk from this source?

Performance assessments for active burial grounds in the 200 East and West 200 Areas provide current estimates of potential environmental contamination and doses to the "maximum exposed individual" from burial ground operation and closure and compare dose estimates to performance objective dose limits for the facilities. There are two potential pathways to exposure for the Mixed Waste Trenches including the groundwater and dispersion in the air, although air dispersion has a current anticipated dose of Nil from the 200 West Area burial grounds on the whole. The groundwater dispersion could impact the ecological resources, although at present, the performance assessment indicates the dose is well below the performance objective, and the Mixed Waste Trenches (Trenches 31 and 34) are only a portion of Burial Ground 200-W-5.

The exposure scenarios required by DOE O 435.1 are identical for purposes of obtaining disposal authorization and for obtaining approval to close a facility; thus the applicable DOE O 435.1 exposure scenarios identified as part of Waste Management Area (WMA) C PA development were used (RPP-ENV-58426, Rev. 0, p. 4-1; RPP-RPT-47479, Rev. 1). RPP-RPT-47479 also includes scenarios required by the WAC, CERCLA, and Native American scenarios used for informational purposes; however, the exposure

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Frequency with High Consequence Category) and are considered for accidents or hazardous conditions that are assigned to Risk Bin II (Extremely Unlikely Events with High Consequences or Unlikely Events with Moderate Consequences). Safety management programs are considered acceptable for addressing residual risks posed by other (Risk III/IV) conditions (RPP-19337, Rev. 0).

scenarios addressed under the WAC and CERCLA evaluate exposures that are not required for the operation of IDF.

Required analyses to support the IDF PA are organized into the following groups (RPP-ENV-58426, Rev. 0):

- All-Pathways scenario and dose – considers nine exposure pathways, including the consequence of volatile gasses migrating from the emplaced waste to the atmosphere.
- Inadvertent Intruder scenarios – contains four scenarios (one acute scenario and three chronic scenarios), with appropriate exposure pathways.
- Groundwater Impact – evaluated by comparing calculated radionuclide and hazardous chemical concentrations in groundwater with U.S. EPA drinking water standards.

Contamination from IDF may enter the environment through air, soil, or groundwater. Soil may be contaminated by activities that would bring waste/contaminants to the surface, or by contaminated groundwater impacting soil. Air contamination might occur via diffusion from the emplaced waste to the ground surface where it would then be transported by wind. Groundwater contamination might occur when water encounters the waste, mobilizes contaminants, and transports the contamination through the vadose zone to groundwater. After contaminants have entered one of these media, the contamination can be transported through various pathways to human and ecological receptors.

7. What is the time frame from each of the initiating events to human exposure or impacts to resources?

No waste has been emplaced in the IDF; therefore, all potential impacts are in the future after IDF has been opened for operations. Modeling supporting the IDF PA is still in progress but earlier studies would indicate that future impacts would be within appropriate limits during the time frame represented in this Review.

8. Are there current on-going releases to the environment or receptors?

No waste has been emplaced in the IDF; therefore, there are no current releases to the environment or receptors.

POPULATIONS AND RESOURCES CURRENTLY AT RISK OR POTENTIALLY IMPACTED

As mentioned in **Part I**, there is no Documented Safety Analysis for the IDF; however, a hazard analysis was prepared for the IDF in accordance with 10 CFR 830 and DOE-STD-3009-94. The following hazard types are considered outside the scope of the hazard analysis, including (RPP-19337, Rev. 0, p. 1-2):

- Standard industrial hazards, including slips, trips, and falls that are adequately addressed in the existing safety basis.
- Hazards associated with the transportation of waste and failed melters to the IDF; separate safety documents will be developed to address these shipping hazards.
- Construction activities that involve standard industrial hazards will be analyzed through job-specific hazard analyses.
- Any supplemental waste forms that may be added to the IDF are not included in this hazard analysis; hazards associated with supplemental waste forms will be considered separately.

IDF activities are proposed that are not currently authorized in the existing tank farm safety basis. The hazard evaluation addresses IDF operations associated with receiving, handling, and storing ILAW and

non-ILAW radioactive waste generated by retrieval and WTP activities, but does not address TRU waste storage (RPP-19337, Rev. 0, p. 4-1).

The Hazards and Operability Study (HAZOP) process (AIChE 1992) was used to identify causes and consequences of potential off-normal conditions associated with IDF operations where the HAZOP results include qualitative estimates of frequencies and consequences, with no consideration of controls for hazardous conditions (RPP-19337, Rev. 0).

The Department of Energy and contractor site-specific safety and health planning that includes work control, fire protection, training, occupational safety and industrial hygiene, emergency preparedness and response, and management and organization—which are fully integrated with nuclear safety and radiological protection—have proven to be effective in reducing industrial accidents at the Hanford Site to well below that in private industry. Further, the safety and health program must effectively ensure that ongoing task-specific hazard analyses are conducted so that the selection of appropriate PPE can be made and modified as conditions warrant. Task-specific hazard analyses must lead to the development of written work planning documents and standard operating procedures (SOPs) [DOE uses the term work planning documents in addition to procedures] that specify the controls necessary to safely perform each task, to include continuous employee exposure monitoring. As such, mitigation actions will generally lead to reduced risks.

Facility Worker

Facility workers are at risk when working in or around areas with contaminated soils, including working on active remedial activities involving these legacy sources; however, no such activities are being conducted at IDF and no waste has been emplaced at the site. However, during maintenance and monitoring operations near the IDF landfill, there may be the potential for hazards related to standard industrial accidents but not consequences related to radiation exposure. There are hazardous conditions with potential significant facility worker consequences; however, it is expected that existing safety management programs will adequately address these issues (RPP-19337, Rev. 0).

Facility Worker: Risks are thus rated as *Not Discernible (ND*) because no waste has been emplaced at the site, with mitigated risk also *ND* due to employed safety measures.

Co-Located Person (CP)

Co-located persons would be expected to have similar or lower risks that those for facility workers.

Co-Located Person: Risks are thus rated as *ND*, with mitigated risk of *ND* for reasons described above.

Public

The public would be expected to have even lower risks than that for facility workers or co-located persons due to the remote distance to the site.

Public: Risks are rated as *ND*; mitigated risk is rated as *ND*.

Groundwater and Columbia River

As illustrated in Table H.9-5, the vadose zone (VZ) GTM values for the IDF Group A and B primary contaminants (PCs) remaining in the vadose are all *Not Discernible* (*ND*) (for protected resources including groundwater and the Columbia River) because no wastes have been emplaced in the IDF to date and thus no plumes can be related to the IDF. Thus the overall rating for the CP-OP-7 EU is also *ND* for the protected resources. Furthermore, IDF contaminants will subsequently be contained in a double-

lined landfill with RCRA-complaint leachate collection with plans to cover the landfill with a modified RCRA Subtitle 'C' barrier.

Ecological Resources

Summary of Ecological Review:

- Approximately 97% of the EU consists of level 1 and level 0 resources.
- Level 3 habitats south of the EU within the adjacent landscape buffer area are contiguous with mature shrub-steppe level 4 extending south of the 200-East Area.
- Because over 41 acres of the 42.3 acres in the EU are classified as level 2 or lower, loss of habitat during cleanup activities is not expected to significantly impact habitat connectivity outside the 200-East Area.

Cultural Resources

The CP-OP-7, IDF EU is located within the 200-East Area of the Hanford Site, an area known to have low potential to contain Native American Precontact and Ethnographic archaeological resources and Pre-Hanford Early Settlers/Farming resources. Much of the 200 Areas were addressed in a cultural resources report entitled *Archaeological Survey of the 200 East and 200 West Areas, Hanford Site* (Chatters and Cadoret 1990). The focus of this archaeological survey was on inventorying all undisturbed portions of the 200-East and 200-West Areas. This report concluded that much of the 200-East and 200-West Areas can be considered areas of low archaeological potential with the exception of intact portions of an historic/ethnohistoric trail/road corridor which runs through the 200-West Area.

Small portions of the CP-OP-7, IDF EU have been inventoried for archaeological resources under three cultural resource reviews: HCRC#87-200-046 (Chatters 1988), HCRC#2012-600-031a (Gilmour, Solimano and Daniels 2013), and HCRC#2013-600-012a (Sheldon et al 2014). None of these cultural resource reviews resulted in the identification of any cultural resources within the CP-OP-7, IDF EU. It is unknown if an NHPA Section 106 review has been completed specifically for the remediation of the CP-OP-7, IDF EU. It is very unlikely that intact archaeological material is present in the areas that have not been inventoried for archaeological resources (both on the surface and in the subsurface), because soils in the entire EU appear to have been extensively disturbed by Hanford Site activities.

Archaeological sites, buildings and Traditional Cultural Properties (TCPs) located within the EU[8]

- Three archaeological isolates (one associated with the Native American Precontact and Ethnographic Landscape, and 2 with the Pre-Hanford Early Settlers/Farming Landscape) have been documented within the CP-OP-7, IDF EU. While none of these isolates have been formally evaluated for listing in the National Register of Historic Places, it should be noted that isolates are typically considered not eligible.

Archaeological sites, buildings and TCPs located within 500 meters of the EU

- Segments of the National Register-eligible Hanford Site Plant Railroad, a contributing property within the Manhattan Project and Cold War Era Historic District, with documentation required, are located within 500 meters of the CP-OP-7, IDF EU. In accordance with the 1998 *Hanford Site*

[8] Traditional cultural property has been defined by the National Park Service as "a property, a place, that is eligible for inclusion on the National Register of Historic Places because of its association with cultural practices and beliefs that are (1) rooted in the history of a community, and (2) are important to maintaining the continuity of that community's traditional beliefs and practices" (Parker and King 1998).

Manhattan Project and Cold War Era Historic District Treatment Plan (DOE-RL 1998), all documentation requirements have been completed for this property.

- There are 7 National Register-eligible buildings that are contributing properties within the Manhattan Project and Cold War Era Historic District that are located within 500-meters of the CP-OP-7, IDF EU (all 7 are contributing within the Manhattan Project and Cold War Era Historic District, 6 with individual documentation required, and 1 with no additional documentation required). In accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE-RL 1998), all documentation requirements have been completed for these properties.

Table K.64 (Appendix K) has more details about the 7 buildings that are National Register-eligible Manhattan Project and Cold War Era buildings located within 500-meters of the CP-OP-7, IDF EU.

Closest Recorded TCP

There are two recorded TCPs associated with the Native American Precontact and Ethnographic Landscape that are visible from the CP-OP-7, IDF EU.

CLEANUP APPROACHES AND END-STATE CONCEPTUAL MODEL

Selected or Potential Cleanup Approaches

The TC&WM EIS (DOE/EIS-0391 2012) investigated alternatives for disposing of low-level waste, mixed low-level waste, immobilized low-activity waste, and WTP melters. The streams considered included tank closure activity waste; onsite non-CERCLA, non-tank-activity wastes; and offsite waste. One part of the preferred remedial alternative is to dispose of newly generated quantities of these waste forms in the IDF. The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE. The current closure plan is to cover the IDF with a modified RCRA Subtitle C barrier.

No final cleanup decisions have not been made for those remaining Waste Treatment, Storage and Disposal (TSD) Facilities that have not been addressed elsewhere, including the IDF (DOE/RL-2014-11, Rev. 0, p. B-13).

Contaminant Inventory Remaining at the Conclusion of Planned Active Cleanup Period

The *planned* or expected inventory for the IDF were taken from the Draft Inventory Summary developed for the IDF PA (RPP-ENV-58562, Rev. 2). The total inventories from the *Current Operations Case* (Case 7) (RPP-ENV-58562, Rev. 2, Table 10-1 and Table 10-2) are used to represent the future IDF inventories shown in Table H.9-2 through Table H.9-4.

The Active Cleanup active cleanup period extends until 2064 (CRESP 2015a), which is around the same time as waste emplacements in IDF are completed or slowing significantly (DOE/RL-2014-11, Rev. 0). Thus the future inventories shown in Table H.9-2 through Table H.9-4 represent the contamination expected to remain in the IDF after the planned active cleanup period.

Risks and Potential Impacts Associated with Cleanup

As described earlier in **Part VI**, a HAZOP was used to identify causes and consequences of potential off-normal conditions associated with IDF operations (RPP-19337, Rev. 0). The results of the hazard evaluation indicated that there appear to be no offsite public or onsite worker Risk Bin I or II hazardous conditions associated with IDF operations where these conditions would dictate evaluation of safety class SSCs and/or TSR controls. There are hazardous conditions with potentially significant facility worker

consequences; however, it is expected that the existing DOE safety management programs will adequately address these issues. However, because no final cleanup or D&D decisions have been made for the IDF (DOE/RL-2014-11, Rev. 0, p. B-13), there is *insufficient information* (*IS*) to assess final closure risks and potential impacts.

Based on likely closure plans, there would appear to be no additional risks to protected resources (groundwater and the Columbia River) from operation and closure of the IDF, a double-lined landfill with RCRA-complaint leachate collection with plans to cover the landfill with a modified RCRA Subtitle 'C' barrier.

POPULATIONS AND RESOURCES AT RISK OR POTENTIALLY IMPACTED DURING OR AS A CONSEQUENCE OF CLEANUP ACTIONS

Facility Worker

During waste emplacement operations, the Hazard Analysis suggested that all activities would corresponding to Risk Bins III and IV (where more details on the analysis are provided earlier in **Part VI**). These bins correspond to those conditions where event frequency is beyond extremely unlikely (BEU) or the low consequence category or when the event frequency is extremely unlikely (EU) and the consequence category is moderate (RPP-19337, Rev. 0, p. 4-5). The unmitigated risk ratings are *Not Discernible* (*ND*) to *Low* to account for uncertainties and on-going evaluations of the IDF.

No final cleanup or D&D decisions have not been made for those remaining Waste Treatment, Storage and Disposal (TSD) Facilities that have not been addressed elsewhere, including the IDF (DOE/RL-2014-11, Rev. 0, p. B-13). Thus there is *insufficient information* (IS) to assess risks or potential impacts to facility workers.

Unmitigated Consequences: Facility Worker – *ND-Low* (Operations) and *IS* (Closure and D&D)

Mitigation: There are hazardous conditions associated with IDF operations with potentially significant facility worker consequences; however, it is expected that the existing DOE safety management programs would adequately address these issues (RPP-19337, Rev. 0). Thus the risk ratings are not impacted by the mitigation actions (because risk ratings are already *low*).

Furthermore, because no final cleanup or D&D decisions have been made for the IDF (DOE/RL-2014-11, Rev. 0, p. B-13), there is *insufficient information* (*IS*) to assess the impacts of mitigation efforts in final closure risks and potential impacts.

Mitigated Consequences: Facility Worker – *ND-Low* (Operations) and *IS* (Closure and D&D)

Co-located Person

The only workers at increased risks (over those for *Current* conditions as described above) are the facility workers. Thus the ratings for co-located persons are assumed the same (*low* ratings) as those for *Current* conditions.

Unmitigated Consequences: Co-located Person – *ND-Low* (Operations) and *IS* (Closure and D&D)

Mitigation: There is no *additional* mitigation information that would impact the ratings for co-located persons.

Mitigated Consequences: Co-located Person – *ND-Low* (Operations) and *IS* (Closure and D&D)

Public

Only workers or col-located persons would be at risk or subject to potential impacts due to distance and subsequent cover installation.

Unmitigated Consequences: Public – *ND*

Mitigation: No *additional* mitigation actions are likely to be required.

Mitigated Consequences: Public – *ND*

Groundwater and Columbia River

Based on likely closure plans, there would appear to be no additional risks to protected resources (groundwater and the Columbia River) from operation and closure of the IDF, a double-lined landfill with RCRA-complaint leachate collection with plans to cover the landfill with a modified RCRA Subtitle 'C' barrier. Thus ratings would remain *Not Discernible* (*ND*).

Ecological Resources

No cleanup decisions have been made for this EU. As a result, the potential effects of cleanup on ecological resources cannot be made for the active cleanup evaluation period.

Cultural Resources

No cleanup decision for the remaining waste treatment, storage and disposition facilities.

ADDITIONAL RISKS AND POTENTIAL IMPACTS IF CLEANUP IS DELAYED

The IDF was completed in 2005 and has been in a ready-to-serve status awaiting permitting and authorization from DOE. The IDF currently consists of two disposal areas called cells, although the facility can be expanded to a total of six cells, if needed. If operations or covering the IDF landfill is significantly delayed, the landfill and perhaps the waste packages may be at a slightly higher risk of degradation.

NEAR-TERM, POST-CLEANUP STATUS, RISKS AND POTENTIAL IMPACTS

See previous section.

POPULATIONS AND RESOURCES AT RISK OR POTENTIALLY IMPACTED AFTER CLEANUP ACTIONS (FROM RESIDUAL CONTAMINANT INVENTORY OR LONG-TERM ACTIVITIES)

Table H.9-6. Summary of Populations and Resources at Risk or Potentially Impacted after Cleanup.

Population or Resource		Risk/Impact Rating	Comments
Human	Facility Worker	*Insufficient Information (IS)*	Final cleanup and D&D decisions have not been made.
	Co-located Person	*IS*	Final cleanup and D&D decisions have not been made.
	Public	*Not Discernible (ND)*	*De minimus* risks related to contamination emplaced in the IDF landfill (after capping with a modified RCRA Subtitle 'C' cover). Access restrictions and ICs in place, when required.
Environmental	Groundwater from vadose zone[a]	*ND*	Waste contained in a double-lined landfill with RCRA-complaint leachate collection covered with a modified RCRA Subtitle 'C' barrier.
	Columbia River from vadose zone[a]	*ND*	
	Ecological Resources[b]	No cleanup decisions have been made for this EU. Estimated to be ND to Low	Monitoring activities for post-closure conditions are expected to occur. Low impacts are likely if exotic species are introduced to buffer area with level 3 resources.
Social	Cultural Resources[b]	No cleanup decisions have been made for this EU. Estimated to be: **Native American** Direct: Known Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: None Indirect: None	Permanent direct effects are possible if residual contamination remains after remediation. National Register eligible Manhattan Project/Cold War Era significant resources located within 500 meters of the EU will be demolished, but they have already been mitigated.

a. Threat to groundwater or Columbia River for Group A and B contaminants remaining in the vadose zone. There are also not Group C or D primary contaminants associated with this EU.

b. For both Ecological and Cultural Resources see Appendices J and K, respectively, for a complete description of Ecological Field Assessments and literature review for Cultural Resources. Ecological ratings are described in Table 4-11 of the Final Report.

LONG-TERM, POST-CLEANUP STATUS – INVENTORIES AND RISKS AND POTENTIAL IMPACT PATHWAYS

Because of the nature and expected use of the IDF, the final inventories are those provided in Table H.9-2 through Table H.9-4. Risks related to final cleanup and D&D decisions that have not been made and thus there is insufficient information to evaluate.

PART VII. SUPPLEMENTAL INFORMATION AND CONSIDERATIONS

Not applicable.

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ATTACHMENT A

Hanford Site-Wide Risk Review

Evaluation Unit:	IDF
ID:	CP-OP-7
Group:	Operations
Operable Unit Cross-Walk:	NA
Related EU:	NA
Sites & Facilities:	Integrated Disposal Facility operations and closure.
Key Data Sources Docs:	Building Emergency Plan for the Integrated Disposal Facility (HNF-39904, Rev 4) Integrated Disposal Facility Hazards Evaluation (RPP-19337, Rev 0) FACILITY DATA FOR THE HANFORD INTEGRATED DISPOSAL FACILITY PERFORMANCE ASSESSMENT (RPP-20691, Rev 1) Exposure Scenarios for the Integrated Disposal Facility Performance (RPP-ENV-58426, Rev 0) Description of the Natural Systems for the Integrated Disposal Facility Performance Assessment (RPP-ENV-58427, Rev 0) Integrated Disposal Facility 2017 Performance Assessment Modeling Approach (RPP-ENV-58554, Rev 0) Draft Inventory Data Summary for the Integrated Disposal Facility Performance Assessment (RPP-ENV-58562, Rev 2) Integrated Disposal Facility Performance Assessment March 30-31, 2015 Meeting Notes TYPICAL (RPP-ENV-58661, Rev 0)

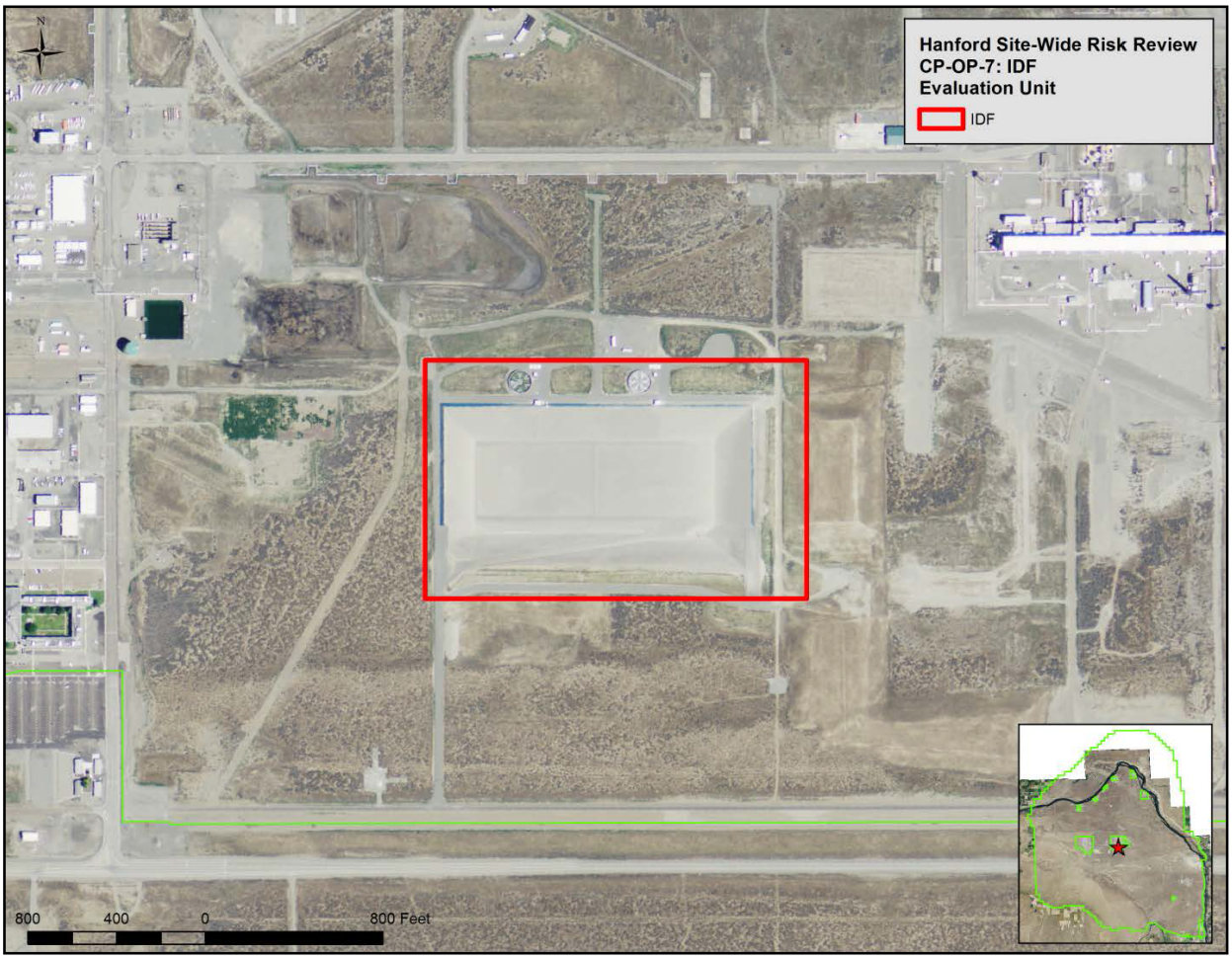

Figure 1. CP-OP-7 (IDF) Site Location Map

Figure 2. CP-OP-7 (IDF) Site Location Map and WIDS Locations

Figure 3. CP-OP-7 (IDF) Site Location Map and Facility Locations

Hanford Site-Wide Risk Review
CP-OP-7 (IDF)
Waste Site and Facility List

Site Code	Name, Aliases, Description	Feature Type	Site Status	ERS Classification	ERS Reclassification	Site Type	Site Type Category	Operable Unit	Exclude from Evaluation	Comments
200-E-106	200-E-106; IDF Integrated Disposal Facility; IDWF; ILAW; Immobilized Low-Activity Tank Waste; Immobilized Low-Activity Waste	Waste Site	inactive	Discovery	None	Trench	Burial Ground	Not Applicable		Not yet in operation
200-E-12	200-E-12; Sand Piles from RCRA General Inspection #200EFY05 Item #5	Waste Site	inactive	Accepted	Rejected	Laboratory	Burial Ground	Not Applicable	X	Rejected
219A1	TRANSFER BUILDING FOR IDF	Facility	ACTIVE			BUILDING	Infrastructure Building			
219A	INTEGRATED DISPOSAL FACILITY	Facility	INACTIVE			BUILDING	Process Building			
219E1	TRANSFER BUILDING FOR INTEGRATED DISPOSAL FACILITY	Facility	INACTIVE			BUILDING	Infrastructure Building			
219E	INTEGRATED DISPOSAL FACILITY	Facility	INACTIVE			BUILDING	Process Building			
219A201	STEEL WATER TANK FOR IDF FACILITY	Facility	INACTIVE			TANK	Infrastructure Building			
219E201	STEEL WATER TANK FOR IDF FACILITY	Facility	INACTIVE			TANK	Infrastructure Building			

Note that only those waste sites with a WIDS (Waste Information Data System) Classification of "Accepted" are included in the evaluation, along with non-duplicate facilities, identified via the Hanford Geographic Information System (HGIS).