APPENDIX H.4

T PLANT (CP-OP-2, CENTRAL PLATEAU)
EVALUATION UNIT SUMMARY TEMPLATE

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TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

PART I. EXECUTIVE SUMMARY

EU LOCATION

T Plant is located on the Hanford Site in the 200 West Area.

RELATED EUS

WRAP, CWC, Sludge Treatment Project, LLBG

PRIMARY CONTAMINANTS, CONTAMINATED MEDIA AND WASTES

T Plant provides storage for waste and contaminated equipment classified as LLW, LLMW, TRU, TRUM, and RH TRU wastes.[1] T Plant is also the designated intermediate storage area for the K Basins sludge, which is classified as RH TRU.

BRIEF NARRATIVE DESCRIPTION

T Plant is an operating facility in the 200W area of the Hanford Site that provides storage, treatment, and shipping and disposal of LLW, MLLW, TRU, TRUM and RH TRU. There are two main facilities associated with T Plant, the 221-T building and 2706-T complex, which are used for storage, treatment, and decontamination of mixed, dangerous, low level waste and TRU. There are also several storage buildings and pads outside of the 2706-T complex that may be used to store, sample, and treat containerized waste.[2]

In addition to the mission described above, T Plant is the designated intermediate storage area for the sludge from the Sludge Treatment Project (EU RC-OP-1). In this phase, the sludge in Sludge Transport and Storage Containers (STSCs) will be taken to T Plant via truck and then stored in cells at T Plant. Transportation will meet the requirements of the Hanford Site-wide Transportation Safety Document[3] and will involve the transport of the STSC on non-public site roads via tractor trailer.[4] This tractor trailer will back up into the T Plant rail loading bay, where the casks will be unloaded and stored in cells covered by concrete shield blocks in the T Plant canyon for interim storage[5].

SUMMARY TABLES OF RISKS AND POTENTIAL IMPACTS TO RECEPTORS

Table H.4-1 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 or immediate areas around the outside the facility; a Co-located Person is an individual located 100 meters from the facility boundary; and Public is an individual located at the closest point on the Hanford Site

[1] HNF 14741-10 Page 2-71
[2] HNF-IP-0263 Page 6
[3] DOE-RL-2001-36, 2002.
[4] SNF-10823, Rev. 1E, 2008.
[5] PRC-STP-00109, Rev. 0.

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 "low" to "high" according to the consequence levels. The estimated mitigated exposure that takes engineered and administrative controls and protections into consideration, when this information is available, is shown in parentheses within Table H.4-1, "IS" denotes insufficient information is available to provide a rating. There are several events postulated in the Documented Safety Analysis (HNF 14741) that have a high impact on the co-located person and the facility worker. More detail of the potential impacts and the resultant ratings are described below.

Groundwater and Columbia River

Direct impacts to groundwater resources 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[6]

No risk ratings are provided for Cultural Resources. Table H.4-1 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.

[6] References throughout this Evaluation Unit Summary Template supporting analyses related to Ecological Resources and/or Cultural Resources may be found in Appendices J and K, respectively. Refer to the specific EU when searching for the reference.

Table H.4-**1. Risk Rating Summary (for Human Health, unmitigated nuclear safety basis indicated, mitigated basis indicated in parentheses (e.g., "High" (Low)).**

Population or Resource		Evaluation Time Period: Active Cleanup (to 2064) — Current Condition: Stabilization & Deactivation	Evaluation Time Period: Active Cleanup (to 2064) — From Cleanup Actions: Final D&D-- Dependent on D&D Methods yet to be determined.
Human Health	Facility Worker	***S&D***: High (Low)	***Proposed method***: IS (IS)
	Co-located Person	***S&D***: High (Low)	***Proposed method***: IS (IS)
	Public	***S&D***: Low (Low)	***Proposed method***: IS (IS)
Environmental	Groundwater (A&B) from vadose zone[a]	*ND* – Sr-90 and U(tot)[c] *Low* – other A&B PCs[d] **Overall**: *Low*	*Low* – All PCs (including Sr-90 and U(tot)[c,d]) **Overall**: *Low*
	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	ND to Low
Social	Cultural Resources[b]	**Native American** Direct: Unknown Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: Known Indirect: Known	**Native American** Direct: Unknown Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: Known Indirect: Known

a. Threat to groundwater or the Columbia River from Group A and B primary contaminants (PCs) (Table 6-1, CRESP 2015a) remaining in the vadose zone. Threats from plumes associated with the T Plant Cribs and Ditches EU are described in **Part V** with additional information provided in Appendix G.6 (CP-GW-2) for the 200-ZP Groundwater Interest Area (GWIA).

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. (IS = insufficient information).

c. These ratings are for PCs with reported inventories (Table H.4-3 through Table H.4-5). (See **Parts V** and **VI** for additional details.) The total uranium and Sr-90 disposed of in the T Plant EU would translate to a *Low* and *Medium* rating, respectively (as shown in Table H.4-6); however, there are no current 200-ZP uranium or Sr-90 plumes, and it would likely require more than 150 years to reach groundwater in a sufficient amount to exceed the drinking water standard over an appreciable area (**Part V**). The total uranium and Sr-90 rating at the end of the Active Cleanup period is *Low* to account for uncertainties in the evaluation.

d. Most of the chromium discharged from this site was via the 216-T-2 Reverse well that went directly to groundwater (accounted for in the 200-ZP groundwater interest area evaluation in Appendix D.6) and thus is not part of the vadose zone inventory.

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

Current

There are several events postulated in the Documented Safety Analysis (HNF 14741) *Small Inside Fire*: A vehicle impacts a single container, the container breaches, and any local ignition source burns the waste. The accident bounds impacts to a single container, pallet of containers, or a HEPA filter because it assumes fully loaded containers pursuant to the SARAH. The unmitigated frequency is Anticipated. Other release phenomena included in this bin are fires that spread to a single container, pallet of containers, or HEPA filters through vehicle impacts and ignition of liquid fuels such as gasoline, diesel fuel, or hydraulic oil. The use of forklifts for handling containers or pallets of containers evaluated in FIR-5 is the highest probability initiator for a small outside fire event because of the frequency of use.

Unmitigated Consequence: Co-located Person – High; Public – Low

Mitigation: Fire suppression systems, Building-active ventilation systems, including associated exhaust HEPA filters, Building Structure, Container Vents

Mitigated Risk: Co-located Person: Low; Public- Low

T Plant Perma-con Fire: Fire inside a 221-T Perma-Con involves the ignition of waste being repackaged inside a Perma-Con.

Unmitigated Consequence: Co-located Person – High; Public – Low

Mitigation: Fire suppression systems, Building active ventilation systems, including associated exhaust HEPA filters, Building Structure, Container Vents

Mitigated Risk: Co-located Person: Low; Public- Low

Large Fire: The studied event is a fire involving 8 drums or other greenhouse (confinement structure) fire involving 82.5 De-Ci due to mishandling, equipment malfunction or properties of TRU waste cause burning of container contents resulting in breach of glovebox or greenhouse confinement. This type of event is described as a fire in the WRAP glovebox enclosure due to flammable or combustion–ignition sources in the waste or electric or static ignition sources, but a similar scenario could occur at T Plant. The accident bounds impacts from other confinement fires such as at the APL gloveboxes, and the 221-T or 2706-TA greenhouse because FIR-8 uses eight containers in the event and the most material at risk involved is at WRAP. Other release phenomena included in this bin are fires that spread as a result of incompatible materials, accidental crushing of a TRU waste drum in the LLW super compactor, breach of pressurized containers, and ignition from a spark or other ignition source.

Unmitigated Consequence: Co-located Person – High; Public – Low

Mitigation: Fire suppression systems, Building active ventilation systems, including associated exhaust HEPA filters, Building Structure, Container Vents

Mitigated Risk: Co-located Person: Low; Public- Low

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

No cleanup decisions have been made regarding the T Plant.

Groundwater, Vadose Zone, and Columbia River

Current

The CP-OP-2 (T Plant) EU resides in the 200-ZP groundwater interest area (GWIA) described in the CP-GW-2 EU (Appendix D.6). The saturated zone in the vicinity of the CP-OP-2 (T Plant) area has elevated levels of total and hexavalent chromium, carbon tetrachloride (CCl_4), I-129, nitrate, and trichloroethene (TCE) based on 2014 groundwater monitoring results (http://phoenix.pnnl.gov/apps/gw/phoenix.html); legacy sites within the CP-OP-2 EU are suspected of being able to contribute mobile contaminants to the saturated zone (DOE/RL-92-16, Rev. 0) although no plumes were associated with the CP-OP-2 waste sites (**Part V**). The current threats to groundwater and the Columbia River from contaminants already in the groundwater are evaluated as part of the CP-GW-2 EU (Appendix D.6). However, current threats to groundwater corresponding to only the CP-OP-2 EU contaminants *remaining* in the vadose zone (Table H.4-6) has an overall rating of *Low* (based on multiple primary contaminants) as described in **Part V**. Contaminated groundwater is treated in the 200-ZP GWIA using the 200 West Pump and Treat (P&T) system[7] (DOE/RL-2016-09, Rev. 0). As indicated in **Part V**, no 200-ZP plumes have been linked to CP-OP-2 waste sites. Threats from contaminated groundwater in the area to contaminate additional groundwater or the Columbia River are evaluated as part of the CP-GW-2 EU (Appendix D.6).

For the 200-ZP GWIA (in 200 West), no plume currently emanating from the CP-OP-2 waste sites intersects the Columbia River at concentrations exceeding the corresponding water quality standard (WQS) as described in **Part V**. Thus current impacts to the Columbia River benthic and riparian ecology would be rated as *Not Discernible* (*ND*). Furthermore, the large dilution effect of the Columbia River on contamination from the seeps and groundwater upwellings also results in *ND* ratings. Thus the overall rating for the Columbia River during the Current period is *ND*.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

As described in **Part VI**, the remedial actions being considered for the CP-OP-2 EU legacy waste sites have not been determined because T Plant will remain operational to perform any needed activities until the disposition of all of the Hanford Waste is accomplished. Because no final cleanup decisions have been made, there is no way to definitively determine the risks and potential impacts to protected resources (groundwater and Columbia River). However, final cleanup decisions will be made that will be protective of human health and the environment and thus some vadose contamination may be removed to satisfy remedial goals; a cover may also likely be installed (at least in places) to limit infiltrating water that tends to be the primary motive force to release and mobilize contamination in the vadose zone. Thus even though there are risks to workers associated with the cleanup of the CP-OP-2 waste sites (described above and in **Part VI**), there is unlikely any discernible impact from likely cleanup actions on groundwater or the Columbia River (and thus no changes were made to the current ratings to account for uncertainties).

Contaminants from the CP-OP-2 EU legacy waste sites may be currently impacting the vadose zone and may be threatening groundwater (although no plumes have been definitively linked to CP-OP-2 sites as indicated in **Part V**); treatment using the 200 West P&T Facility is not predicted to decrease all concentrations to below thresholds before the Active Cleanup phase commences although there should be significant decreases in contaminant levels. Secondary sources in the vadose also threaten to

[7] Soil vapor extraction was used between 1992 and 2012 to remove carbon tetrachloride vapors migrating through the vadose zone into 200-ZP groundwater (Section 12.10.2, DOE/RL-2016-09, Rev. 0).

continue to impact groundwater in the future, including during the Active Cleanup period[8]. The *Low* rating associated with the CP-OP-2 EU waste sites (Table H.4-6) is associated with multiple primary contaminants that could potentially impact the 200-ZP GWIA (which is part of CP-GW-2, Appendix G.6). As described in the TC&WM EIS and summarized in **Part V**, no ratings were altered based on potential changes in recharge rate, radioactive decay, or expected treatment effectiveness; the ratings are maintained as *Low* through the end of the Active Cleanup period to account for any uncertainties in the evaluation[9]. There would not be a sufficient impact on peak concentrations in near-shore region of the Columbia River during or after cleanup to modify ratings (which are already *ND*). Thus the ratings for current threats provided in Table H.4-6 would not be modified (at the end of the Active Cleanup period) except making those for Sr-90 and total uranium *Low* to address uncertainty as described in **Part V**. This overall rating also remains *Low* at the end of the Active Cleanup period.

Ecological Resources

Current

3% of EU and 32% of the buffer area are level 3 resources (no level 4 or 5). Currently, the area is mostly disturbed with buildings, and cleared areas. There could be migratory birds nesting on buildings. Work would be done when birds are not nesting, or other mitigation activities.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

Impact level depends on the remediation activities. Revegetation of the area after remediation needs to consider the potential for competition with higher level resources and minimize the introduction of exotic species along high value resource areas. Construction activity and noise can disrupt sage sparrows and other sensitive wildlife in the buffer area.

Cultural Resources

Current

Much of the land within the EU is extensively disturbed and small portions of the EU has been inventoried for cultural resources. Geomorphology indicates a low to moderate potential to contain intact archaeological resources on the surface and/or subsurface. Traditional cultural places are visible from EU. A portion of a National Register eligible historic/ethnohistoric trail/road is located within the EU. Two archaeological resources are located within 500 meters of the EU.

National Register eligible Manhattan Project/Cold War Era resources have already been mitigated; T-Plant has been identified as eligible for inclusion in the Manhattan Project National Historical Park.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

Archaeological investigations and monitoring may need to occur prior to remediation. The geomorphology indicates a low to moderate potential for intact archaeological resources. Remediation disturbance may result in impacts to archaeological resources if they are present in the subsurface.

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[8] Note that Sr-90, which has a large remaining vadose zone inventory relative to the drinking water standard, and total uranium, which has a relatively small remaining vadose zone source, are not considered significant threats to groundwater due to limited mobility in the Hanford subsurface (uranium and Sr-90) and decay (Sr-90). See **Part V** for additional details.

[9] As indicated in the Table 6-3 in the Methodology Report (CRESP 2015a), a non-zero plume area for a Group A or B primary component would translate into a *Low* rating.

Temporary indirect effects to viewshed are possible during demolition and remediation. Permanent indirect effects are possible if contamination remains after remediation.

National Register eligible Manhattan Project/Cold War Era significant resources located within the EU and 500 meters of the EU will be demolished, but they have already been mitigated. T-Plant has been identified as eligible for inclusion in the Manhattan Project National Historical Park.

Considerations for Timing of the Cleanup Actions

No cleanup actions are currently scheduled for T Plant. T Plant will remain in operation until the disposition of all waste contained in the operating facility.

The saturated zone beneath the CP-OP-2 area (T Plant) currently has elevated levels of total and hexavalent chromium, carbon tetrachloride (CCl_4), I-129, nitrate, and trichloroethene (TCE) based on 2014 groundwater monitoring results (http://phoenix.pnnl.gov/apps/gw/phoenix.html). Sites within the CP-OP-2 EU are suspected of being able to contribute mobile contaminants to the saturated zone (DOE/RL-92-16, Rev. 0) although carbon tetrachloride and TCE were not reported for the CP-OP-2 EU waste sites (Table H.4-5) and no plumes were associated with the CP-OP-2 legacy waste sites (**Part V**). Monitoring and treatment of groundwater is being conducted within the 200-ZP GWIA using the 200 West Pump and Treat Facility, which is described as part of the CP-GW-2 EU (Appendix D.6). Treatment efforts indicate a general downward trend in contaminant concentrations; however, some plume areas have increased and concentrations still exceed maximum contaminant levels. Thus additional cleanup actions may be warranted for this EU.

There is potential for additional contaminant release and migration through the vadose that may eventually impact additional groundwater if cleanup activities related to the CP-OP-2 legacy waste sites are delayed. There is also potential risk from direct radiation to workers (and ecological receptors) from routine maintenance operations. However, there would be no *additional* risk to facility workers, co-located persons, or the public if cleanup is delayed.

Near-Term, Post-Cleanup Risks and Potential Impacts

The post-cleanup risks and impacts are dependent on D&D methods which are not yet determined.

Groundwater: During the Near-term, Post-Cleanup period (described in **Parts V** and **VI** and Table H.4-7), the ratings for the Group A and B primary contaminants are *Low* (including for Sr-90 and total uranium to address uncertainties).

Columbia River: As indicated in **Part V**, no radionuclides or chemicals from the 200 West Area (that includes the CP-OP-2 EU waste sites) are predicted to have concentrations exceeding screening values in this evaluation period. Thus the rating will not be modified and all ratings are *Not Discernible* (*ND*) as is the overall rating (Table H.4-7).

PART II. ADMINISTRATIVE INFORMATION

OU AND/OR TSDF DESIGNATION(S)

Not Applicable

COMMON NAME(S) FOR EU

T Plant

EU Designation: T Plant (CP-OP-2, Central Plateau)

KEY WORDS

LLW, MLLW, TRU, TRUM

REGULATORY STATUS:

Regulatory basis

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

Applicable regulatory documentation

DOE-STD-1027-92, 1997, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* Change Notice No. 1, U.S. Department of Energy, Washington, D.C.

DOE-STD-3010-94, 2000, Airborne Release Fractions/Rates and Respirable Fractions/Rates for Nonreactor Nuclear Facilities, Change Notice 1, U.S. Department of Energy, Washington, D.C.

DOE-STD-1189-2008, DOE Standard, Integration of Safety into the Design Process, U.S. Department of Energy, Washington, D.C.

DOE-STD-3009-94, 2006, Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports, Change Notice 3, U.S. Department of Energy, Washington, D.C.

DOE-STD-5506-2007, Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities, U.S. Department of Energy, Washington, D.C.

HNF-8739, 2012, *Hanford Safety Analysis and Risk Assessment Handbook (SARAH),* Rev. 2, CH2M HILL Plateau Remediation Company, Richland, Washington.

Applicable Consent Decree or TPA milestones

None identified

RISK REVIEW EVALUATION INFORMATION

Completed

3/21/2016

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PART III. SUMMARY DESCRIPTION

The T Plant Complex includes several buildings, storage buildings and outside storage areas, as well as a rail tunnel. The main building, 221-T is a reinforced concrete structure that was the location of the original reactor fuel reprocessing facility that began operation in 1944 using the bismuth phosphate

chemical separation process. Fuel reprocessing was discontinued in 1965 and the T Plant mission changed to primarily repackaging, treatment, decontamination, and storage. Other activities included equipment repair and maintenance. [10]

In the near-term, T Plant will become the intermediate storage area for the K Basins Sludge while it awaits further treatment and disposition. At T Plant, the sludge will be stored in STSCs and will be monitored annually for water loss due to evaporation and replenished with make-up water as necessary. During storage, the headspace in the STSC is vented via natural circulation through two vents at different heights.[11]

CURRENT LAND USE

Current land use is Industrial, for Waste Storage, Treatment and Management at the DOE Hanford Site. Currently, T Plant resides in the 200W area and is used as an operating facility. In addition to the buildings, there are several storage pads both indoor and outdoor that store waste.

DESIGNATED FUTURE LAND USE

T Plant is projected to be operated as long as the waste management mission requires. Lands within the Central Plateau geographic area would continue to be used for the management of radioactive and hazardous waste materials. These management activities would include collection and disposal of radioactive and/or hazardous waste materials that remain onsite, contaminated groundwater management, current offsite commitments, and other related and compatible uses. Specific land-use decisions for Hanford would continue to be made under the NEPA process and the Tri-Party Agreement, based on the current Hanford Strategic Plan (Mission Plan) and on a project-by-project basis[12].

PRIMARY EU SOURCE COMPONENTS

Legacy Source Sites

T Plant is geographically co-located with the following legacy source sites:

218-W-8 , 241-TX-302C , 216-T-33 , 216-T-8 , 241-TX-154 , 200-W-143-PL , 216-T-29 , 216-T-2 , 224-T , 200-W-140-PL, 200-W-142-PL, 200-W-173-PL, 200-W-180-PL, 200-W-227-PL, 200-W-45, 200-W-80, TRUSAF, 200-W-16, 200-W-36, 221-T-11-R, 221-T-15-1, 221-T-5-6, 221-T-5-7, 221-T-5-9, 221-T-6-1, 216-T-11, 200-W-9, UPR-200-W-160

The CP-OP-2 legacy waste sites primarily consist of waste disposal sites associated with 221-T (or T Plant) Facility operations. The CP-OP-2 liquid waste disposal sites include legacy waste sites (e.g., two cribs, a French drain, a trench, an injection/reverse well, and unplanned releases (UPRs)) where liquid wastes was discharged as well as buildings, pipelines and associated equipment, tanks, and an inactive burial ground.

[10] HNF 14741-10 Page 2-24

[11] HNF 41051, Rev. 6, 2014. Page 41.

[12] EIS 0222 (1999) Pages S-14-S-15

High-Level Waste Tanks and Ancillary Equipment

Note that the CP-OP-2 EU waste sites include seven pipeline and associated equipment waste sites where one pipeline (200-W-143-PL) and associated diversion box (200-W-143-PL) are part of the Single Shell Tank (SST) System (DOE/RL-2010-114, Draft A, p. A-22 andA-28) and assumed managed in the Tank Waste and Farms EU (Appendix E.1 through Appendix E.11). Other CP-OP-2 pipelines and associated equipment may have been addressed in the TC&WM EIS and thus the Tank Waste and Farms EU (Appendix E.1 through Appendix E.11); however, the remaining pipeline and related wastes sites will not be evaluated further due to a lack of inventory information.

Groundwater Plumes

The saturated zone beneath the CP-OP-2 area (T Plant) has elevated levels of total and hexavalent chromium (Cr-VI), I-129, nitrate, carbon tetrachloride (CCl_4), and trichloroethene (TCE) based on 2014 groundwater monitoring results (http://phoenix.pnnl.gov/). Sites within the CP-OP-2 EU are suspected of being able to contribute mobile contaminants to the saturated zone (DOE/RL-92-16, Rev. 0); although CCl_4 and TCE were not reported for the CP-OP-2 EU waste sites (Table H.4-5). Monitoring and treatment of groundwater (via the 200 West Pump and Treat Facility) is being conducted within the 200-ZP GWIA, which is described as part of the CP-GW-2 EU (Appendix D.6).

Operating Facilities

The T Plant Operating Facilities include the following buildings[13]:

221-T includes the canyon, head end, tunnel, and galleries. It is the original facility and is constructed of reinforced concrete. The current mission involves handling low-level and TRU wastes, including mixed wastes, and RH TRU wastes. The 221-T building has rail access.

271-T is attached to 221-T and contains administrative offices.

2706-T is composed of the 2706-T Building, and the 2706-TA and 2706-TB additions. The current mission involves handling both low-level and TRU wastes, including mixed wastes. The 2706-T Facility also has rail access.

The 221-T Rail Tunnel is attached to 221-T. The current mission involves handling both low level and TRU wastes, including mixed wastes. This rail tunnel will also be used for the near-term sludge treatment project mission.

T Plant also contains areas that can be used to store low-level and TRU waste, including mixed wastes. These include Storage Buildings 214-T, 277-T, two waste storage modules (HS-030 and HS-032), and the 243-T storage structure. These can be used for hazardous waste and product storage. Storage Module HS-031 is used for product storage only.

The T Plant operations normally stage or store about 500 drums or 100 standard waste boxes (SWBs) at any given time at various receiving and storage areas and pads. Pieces of equipment awaiting decontamination, disposal, or storage are staged in various cells. Sludge Transport and Storage Containers (STSCs) and Large Diameter Containers (LDCs) containing radioactive sludge may be brought to the T Plant for storage. In addition, several systems at the T Plant, such as decontamination waste systems and ventilation systems including high-efficiency particulate air (HEPA) filters, are contaminated with radioactive material.

[13] HNF 14741-10 Pages 2-25-2-26

Mixed waste containers contain varying amounts of hazardous chemicals, including corrosive, reactive, and toxic materials. The hazardous material inventory in Appendix D of the PHA indicates the presence of large amounts of caustics and acids. There are three hazardous material storage modules at T Plant for segregated storage of some of these hazardous materials.

Flammable and combustible liquids associated with T Plant operations are fuels used in transportation vehicles such as trucks and forklifts. Hydrogen and other flammable gases can be generated or contained in waste packages. There are also cylinders of flammable gases on delivery trucks, as well as cylinders of flammable gases stored on the dock.

The primary combustibles are the waste itself, wooden containers, liners, and the combustible items associated with occupying the facility (e.g., documents, furniture, and wiring). Brush and grasses are present in the area, so the contribution of vegetation to the combustible loading is considered and controlled.

At present, the maximum possible inventory is: 41,632 DE-Ci. Soon, T Plant will be used for intermediate storage of K Basins Sludge from the Sludge Treatment Project. With the addition of the STSCs and LDCs from the Sludge Treatment Project, the maximum possible inventory is: 93,152 DE-Ci

D&D of Inactive Facilities

The 224-T and 221-T buildings associated with T Plant complex are currently been transferred to the Hanford organization responsible for D&D.

LOCATION AND LAYOUT MAPS

The T Plant Complex is located in the 200W Area on the northwest corner of 23rd Street and Beloit Avenue. The complex is bounded by a fence line and consists of the 221-T Building (and the attached 271-T Building), the 221-T Railway Tunnel, the 2706-T Building and additions (2706-TA and 2706-TB), several storage buildings, and outside storage areas.[14]

[14] HNF 14741- 10 Page 2-25

Figure H.4**-1. Map of CP-OP-12 T Plant**

PART IV. UNIT DESCRIPTION AND HISTORY

EU FORMER/CURRENT USE(S)

T Plant was the location of the original reactor fuel reprocessing facility that began operation in 1944 using the bismuth phosphate separation process. Once this process was discontinued, T Plant's mission changed to primarily repackaging, treatment, decontamination, and storage. Other activities include equipment repair and maintenance. T Plant is also capable of shipping and receiving. [15]

In the near future, T Plant will become an interim storage facility for the K Basins Sludge until its ultimate disposition.

1. Processes that produced the radioactive material and waste contained in the facility

The process cells once housed process equipment. Some are now used for storing and/or handling radioactive waste resulting from past decontamination work.[16]

[15] HNF 14741-10 Page 2-25
[16] HNF 14741-10 Page 2-44.

In the near-term, T Plant will receive and store K Basins Sludge Project sludge, which was created when irradiated fuel rods from the N Reactor that had been stored in these basins began to deteriorate, and is a mixture of tiny fuel corrosion particles, fuel rod and metal fragments, and wind-blown soil and sand.

2. Primary radioactive and non-radioactive constituents that are considered risk drivers

There are several classes of radioactive materials and waste contained or stored at T Plant. These include: LLW, LLWM, TRU (both remote and contact) and TRUM[17].

3. Containers or storage measures are used for radioactive materials at the facility

Current[18]:

The facilities generally use containers compliant with the Hanford Site waste acceptance criteria specified by DOE O 435.1 and subsequent DOE Manual 435.1-1. Containers compliant with the WIPP waste acceptance criteria (DOE/WIPP-02-3122) also meet the criteria in the Hanford Site waste acceptance criteria. Drums, boxes, shipping casks, and other material packaging used for storing, staging, transferring, or transporting waste are present at T Plant.

208 L, 284 L, and 322 L Drums: Construction is typically of rolled sheet metal welded down a vertical seam with an integral bottom of similar metal attached to be leakproof. The lid is a separate piece that presses against a gasket when affixed with a bolted clamp ring. These drums may be fitted with a polyeurea coating or overpack if necessary.

Small Drums and Cans: Small drums and cans provide primary confinement for radioactive, mixed waste, and hazardous wastes. Containers selected for use are compatible with the waste contents. Thirty gallon drums are the normal size for lab packing RCRA waste. The containers are of metal construction with a mechanical lid securing device. Lids are secured with bolt rings or clamp rings. The drums are similar in design and construction materials to the 208 L drums described above.

Standard Waste Box: The SWB was designed to fit the TRUPACT II container. The SWB body panels are constructed of steel. The SWB is closed by a gasket and 42 screws, contains four filter vent penetrations.

Ten Drum Overpack: The TDOP provides primary confinement to a large drum like volume that can be loaded directly or as an overpack for 10 full 208 L drums, up to six full 322 L drums, or an SWB.

TRUPACT II: The TRUPACT II is a shipping container whose criteria and design are documented in the WIPP waste acceptance criteria (DOE/WIPP-02-3122).

Metal Waste Boxes: Metal box is a generic term for containers constructed of sheet metal with welded joints and a mechanically attached lid. Designs vary from qualified DOT Type A to containers meeting the definition of a strong tight container.

Wooden Waste Boxes: Wooden boxes have long been acceptable for LLW disposal. One waste acceptance criterion is that wooden boxes be treated for fire resistance, either chemically or by applying a fire-resistant coating (i.e., appropriate paint).

Steel Waste Disposal Boxes: One specialized waste box container is the SWDB used for storing RH waste. It is a 22.5-ton, thick walled steel structure. Nested inside are a rectangular grout container and an open-top steel box. Prior to emplacement, the rectangular grout container is placed within this thin

[17] HNF 14741-10 Page 2-77
[18] HNF 14741-10 Page 2-129

walled steel overpack. SWDBs provide two critical and essential safety functions: shielding and confinement.

Near-term Future:

Material packaging associated with the K Basin sludge includes the Large Diameter Containers (LDCs), Sludge Transport and Storage Containers (STSCs), the sludge transport system (STS), and the LDC/STSC overpack. The sludge from the Sludge Treatment Project will be containerized in STSCs. These containers are designed as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Power Plant Components," Subsection NB, "Class I Components," up to but not including application of the code stamp as allowed for in NUREG/CR-3854, Fabrication Criteria for Shipping Containers.[19] As necessary, an LDC or overpack may be used in addition to the STSC.[20]

4. Classification of radioactive material and waste contained or stored within the facility

There are several classes of radioactive materials and waste contained or stored at T Plant. These include: LLW, LLWM, TRU (both remote and contact) and TRUM[21].

5. Average and maximum occupational radiation doses incurred at the facility

Annual dosimeter results of individual workers from 2013 and 2014 are shown below in Table H.4-2. T Plant is not listed below in Table H.4-2 but it could be estimated that the doses would range from lower to similar to the 200 West area dosimeter results.

[19] PRC-STP-00718, Rev. 0- 2014, Page x.
[20] HNF 14741-10 Page 2-118
[21] HNF 14741-10 Page 2-77

Table H.4-2. Thermoluminescent Dosimeter Results (2013 and 2014) [22]

(millirem/year) [a]

Location	No. of Dosimeters	2013		2014		Percentage Change [e]
		Maximum [b]	Average [c, d]	Maximum [b]	Average [c, d]	
100-K	14	112 ± 12	86 ± 17	177 ± 140	89 ± 52	3
100-N	1	87 ± 13	84 ± 7	91 ± 14	82 ± 14	-2
200-East	42	230 ± 131	105 ± 56	217 ± 256	104 ± 57	0
200-West	24	158 ± 9	104 ± 41	157 ± 14	102 ± 42	-1
200-North	1	91 ± 14	86 ± 14	107 ± 16	91 ± 27	5
300 Area	8	124 ± 9	95 ± 26	114 ± 14	90 ± 20	-4
300 TEDF	6	93 ± 13	91 ± 4	91 ± 14	88 ± 8	-2
400 Area	7	100 ± 58	92 ± 9	98 ± 11	88 ± 11	-3
618-10	4	84 ± 11	83 ± 3	81 ± 8	80 ± 2	-2
CVDF	4	82 ± 13	80 ± 3	78 ± 9	77 ± 2	-2
ERDF	3	91 ± 11	88 ± 6	89 ± 22	84 ± 8	-4
IDF	1	102 ± 15	92 ± 16	97 ± 14	90 ± 13	-1

[a] To convert to international metric system units, multiply millirem/year by 0.01 to obtain millisievert/year.
[b] Maximum values are ± analytical uncertainty.
[c] ± 2 standard deviations.
[d] Each dosimeter is collected and read quarterly.
[e] Numbers indicate a decrease (-) or increase from the 2013 mean.

CVDF = Cold Vacuum Drying Facility (100-K Area).
ERDF = Environmental Restoration Disposal Facility (200-West Area).
IDF = Integrated Disposal Facility (200-East Area).
TEDF = 300 Area Treated Effluent Disposal Facility.

6. Processes and operations conducted within the facility

The main process goals at T Plant are to: clean out stored waste and contaminated equipment; store waste; decontaminate equipment; verify, sample, treat, and repack LLW, LLMW, TRU, and RH wastes.[23] Decontamination and waste storage, treatment, repackaging, and verification are the central activities at T Plant[24].

Fuel reprocessing was discontinued and the T Plant mission changed to primarily repackaging, treatment, decontamination, and storage.

Other activities included equipment repair and maintenance.

Current and future activities at T Plant include the following[25]:

- Shipping and receiving
- Equipment repair and maintenance
- Waste container handling
- Waste staging and storage
- Storing and treatment of K Basin Bulk Sludge and North Loadout Pit (NLOP) (low activity) sludge and similar materials

[22] DOE/RL-2014-52, Table 4.1., pg. 4.2
[23] HNF 14741-10 Page 2-71
[24] HNF 14741-10 Page 2-77
[25] HNF 14741-10 Page 2-25

- Storage of sludge transport and storage containers (STSCs) containing K East Engineered Container Sludge, K West Engineered Container Sludge, and Settler Tank Sludge,
- Storage of grouted RH sludge
- Nonintrusive survey and inspection, including NDE and NDA
- Waste treatment (e.g., void fill, stabilization and grouting, neutralization, noncompliant item removal)
- Intrusive sampling, including mobile glovebox
- Verification
- Size reduction
- Packaging and repackaging
- Headspace Gas Sampling (HSGS)
- Container venting
- Decontamination
- Spill control
- Process large boxes, equipment, and high inventory containers (TPA M-91[26])

Near-term Processes at T Plant for the Sludge Treatment Project: While in storage at T Plant, the STSCs would be monitored annually for water loss due to evaporation and replenished with make-up water as necessary. This is necessary to ensure the sludge remains in a fully wetted environment to prevent drying out and potential uranium metal oxidation. During storage, the headspace in the STSC is vented via natural circulation through two vents at different heights. The concentration of hydrogen is maintained at less than 4 volume percent in the T Plant cells and in the headspace of the STSC through operation of the T Plant exhaust ventilation system. In the event the T Plant exhaust ventilation system is inoperable, the chimney effect of the STSC vents and the natural circulation of air through the T Plant cells as a result of temperature differential will ensure the concentration of hydrogen is maintained at less than 4 volume percent in the T Plant cells and in the headspace of the STSC.[27]

7. Process flow of material into and out of the facility

Current[28]:

Before equipment or waste containers are sent to the T Plant, they are evaluated for acceptance at 221-T Canyon or the 2706-T/TA/TB Facility using the Waste Acceptance Criteria for T Plant, in Chapter Five (5) of the SWOC WAC (HNF-EP-0063). If equipment or waste is sent to the T Plant that is not in accordance with facility acceptance criteria, it is returned to the customer or action is initiated to rectify the discrepant condition. Once accepted, the process flow can take several routes, based on the type of waste or contaminated equipment.

LLW (including MLLW), TRU waste (including mixed TRU waste), and contaminated equipment are typically received at the 2706-T/TA/TB Facility or at the 221-T building's railway tunnel. They may be staged in a yard or building storage area prior to processing at the 2706-T/TA/TB Facility, the 221-T railway tunnel, or the 221-T Canyon, including the head-end. MLLW that does not meet Hanford disposal requirements may be sent off site for treatment and disposal or to other SWOC facilities for storage and treatment.

[26] The Tri-Party Agreement (TPA) M-91 Milestone, which is the TRU Waste storage, retrieval, and repackaging milestone)
[27] HNF 41051, Rev. 6, 2014. Page 41.
[28] DOE EIS 0391 Appendix E Pages E-239

TRU (including mixed TRU) waste received for HSGS is sent to the 2706-T/TA/TB Facility. After HSGS is completed, the waste is sent to the Central Waste Complex (CWC) or Waste Receiving and Processing Facility (WRAP). Other TRU waste or TRU waste-contaminated equipment could be sent to the 221-T railway tunnel, the 221-T Canyon, or the 2706-T/TA/TB Facility. It could be staged in a yard or building storage area prior to processing at the 2706-T/TA/TB Facility, the 221-T railway tunnel, or the 221-T Canyon. The primary access for transferring waste containers into the 221-T Canyon is through the 221-T head-end. The head-end is used as an interim waste staging area for moving containers into and out of the canyon. The T Plant currently contains RH-TRU waste received from offsite sources. In the future, it is possible that other RH waste would also come to the T Plant.

Near-term Sludge Receipt[29,30]:

Interim storage of the remaining K Basin sludge material is a planned activity for the 221-T Canyon. Three types of sludge will be segregated in separate sludge transfer and storage casks (STSCs), staged in a STSC, and transported to the T Plant Complex.

Upon STSC receipt at the T Plant railroad tunnel, the cask will be vented and then purged with nitrogen gas to remove any hydrogen gas accumulations from the headspace to ensure less than the lower flammability limits are achieved prior to offloading the STSC. After venting and purging the STSC , the cask lid will be remotely removed and the STSC will be purged with nitrogen gas to ensure less than lower flammability limits are achieved prior to further handling and vent installation.

The previous T Plant cell modifications included installation of storage racks, secondary containment with pump out capability, leak detection, cask and LDC inert gas system, hoisting/rigging hardware, and enhanced closed-circuit television for monitoring and surveillance. All of these modified features will be used for storing sludge in STSCs at T Plant. Storage cells are located beneath the canyon deck level will be equipped with secondary containment and leak detection capability. Secondary containment consists of a freestanding liner equipped with a leveling base and a storage rack. Each secondary containment system is equipped with a leak detection system and a sump pump. In the event of a breach of the primary containment provided by the STSC while in storage, liquids leaking from an STSC are retained by the secondary containment and collect in the sump. Each leak detector assembly is electrically connected to separate local control panels located in the T Plant operating gallery where monitoring for leaks takes place. If a leak is detected, the leaking STSC is placed into an overpack container (staged in the sixth position in the cell) and the contents of the storage cell secondary containment sump will be pumped back into the overpacked STSC.

8. What effect do potential delays have on the processes, operations, and radioactive materials in the facility?

Current:

At present, T Plant is acting mainly as storage for various wastes from other projects. Delays in the movement of this waste to ultimate disposal could result in longer than anticipated storage times, which present the possibility of using the containers beyond their present storage-life, which is currently assumed to be 20 years[31]. This potential impact on containers is currently managed through a surveillance and NDE/NDA program which verifies the container structural integrity.

Near-term Future:

[29] HNF 14741-10 Page 2-78
[30] CHPRC 01625-02 Page 2-4
[31] HNF-EP-0063 Page 5-4

Delays in design and construction of the Phase 2 treatment system, or the technology development program to support it, would result in the sludge being stored for a longer time period in T-Plant, once transferred. Such a delay could make retrieval of the sludge for processing problematic (note: the aging properties of the sludge materials while in storage at T Plant is line of inquiry in the technology development planning[32]).

9. What other facilities or processes are involved in the flow of radioactive material into and out of the facility?

The flow of radioactive material into or out of the facility may involve the other Solid Waste Operations Complex facilities: WRAP, CWC, LLBG. In the near-term future, the flow of materials will also involve the Sludge Treatment Project and its associated facilities: KW Basins and ECRTS.

Waste transfer is the process of physically moving waste or waste containers by vehicles (with or without trailers) between the four facilities within SWOC and adjacent facilities with similar control sets. The transfer activity begins when responsibility for the loaded conveyance is accepted by SWOC. A load "in transfer" remains the driver's responsibility (e.g., material accountability) during stops or staging associated with the transfer. The originating facility retains overall responsibility for the conveyance until the waste is accepted by the receiving facility[33].

10. Shipping of material

Waste transportation involves shipments from offsite and onsite waste generators to SWOC facilities. Onsite shipments must comply with the Transportation Safety Document (TSD), required under DOE O 460.1C, *Packaging and Transportation Safety*. The TSD is the approved documented safety analysis for onsite transportation and packaging activities. Offsite shipments (arriving or leaving) must comply with the requirements of 49 CFR 171, "Hazardous Materials Regulations." Offsite shipments may be made by truck, railroad, or other transportation conveyance. The railroad tracks are located inside the boundary of T Plant; however, T Plant Operations has taken measures to preclude entry of a train without positive actions[34].

11. Infrastructure considered a part of the facility

The infrastructure associated with T Plant operations is listed as follows[35]:

221-T Building and Attached 271-T Building: The 221-T Building (canyon, head end, tunnel, and galleries) is the original facility. The 271-T Building is attached to the 221-T Building and is primarily administrative offices.

2706-T Facility: The 2706-T Complex includes the 2706-T Building, 2706-TA Building addition, 2706-TB Building addition, MO-433, MO-739, and two hazardous waste storage modules. Currently, one module is used for product storage while the second is used for storage of Hanford Site tank waste. Both hazardous waste storage modules (HS-030 and HS-032) may be used to store LLW or TRU wastes including mixed waste. MO-739 is located immediately outside the fence. The 2706-T, 2706-TA, and 2706-TB structures make up a single building.

[32] PRC-STP-00615, "Preliminary Technology Maturation Plan for the K-Basins Sludge Treatment and Packaging Facility," March 2012
[33] HNF 14741-10 Page 2-87.
[34] HNF 14741-10 Page 2-89.
[35] HNF 14741-10 Pages 2-43- 2-58

221-T Railway Tunnel: The 221-T railway tunnel is attached to the 221-T Building and is the primary point for transferring large items in and out of the 221-T Canyon.

T Plant Building and Yard Storage: These include Storage Buildings 214-T, 277-T, waste storage module (HS-031), and the 243-T storage structure. The 214-T Chemical Storage Building is located on the west side of the 221-T Building near the tunnel. It is used to store LLW, mixed waste, TRU waste, and hazardous waste, liquid detergents, and chemicals. 277-T is used for storage of materials, equipment, and LLW, TRU, or mixed wastes, when additional storage space is necessary. The R-5 Waste Storage Area is an open storage area for staging waste containers. The 229-W Packaging Supplies Storage Area is a storage area for empty drums, liners, etc., to support waste packaging operations in the 221-T Building. The 221-TA storage area is an open storage area at the southeast corner of the 221-T Building where LLW may be stored. The 2706-T Treatment and Storage Pad comprises several storage areas. The 211-T Outside Storage Area (located just west of the 221-T Building) consists of a pad with a sump and secondary containment with a concrete berm; it is used for storing tankers and containers that contain liquid waste. Adjacent to the pad is a caged area where waste with liquids is stored until it can be repackaged. The 211-T Outside Storage Area may also be used to store non-liquid wastes. The Lay-Down Yard is an open storage area for excess material and equipment storage.

243-T Covered Storage Pad: A covered storage pad located at the west corner of the T Plant Complex provides protection of the waste containers from the environment.

291-T Building and Stack: Structures that make up the 291-T Building and stack consist of the 291-T stack, the stack monitoring system, exhaust fans, four HEPA filter banks, and the 291-T Building control house.

221-TA Building: The 221-TA Building is attached to the south end of the 221-T Building and serves as an enclosure for two canyon ventilation supply fans.

2715-T Building: The 2715-T Building is located west of the 221-T Building and south of the 271-T Building. This building is used as an instrument shop for radiological control instrumentation.

2716-T Building Tunnel Access Change Facilities: The 2716-T Building is a single-wide modular building of wood construction and serves as a tunnel access station and check-out station.

292-T Building: The 292-T Building is unused and unoccupied.

MO-369 Office Building: MO-369 is a doublewide modular office building.

MO-433 Trailer: Located to the north of 2706-T, the MO-433 trailer serves as office space and a change room to support 2706-T operations.

MO-459 Trailer: The MO-459 trailer is used as a women’s changing room.

MO-739 Trailer: The MO-739 trailer is currently unoccupied but may be used for storage.

MO-892 Conference and Office Building: MO-892 is a doublewide modular office building.

MO-906 Maintenance Office Building: MO-906 is a doublewide modular office building.

Laundry Storage Connex Boxes: Two 6.1 m (20 ft) long connex boxes are located immediately adjacent to the southwest corner of the 221-T Building. They provide storage for clean and dirty laundry.

2712-T Electrical Controller Building: The 2712-T Building provides electrical service to West Tank Farms.

Mobile Headspace Gas Sampling Unit and Mobile Nondestructive Assay and Nondestructive Examination Units may be used at T Plant

Adjacent Facilities to T Plant currently undergoing D&D:

222-T Building-The 222-T Building was an analytical laboratory. It is abandoned and is scheduled for demolition.

222-T Building-The 222-T Building was an analytical laboratory. It is abandoned and is scheduled for demolition.

LEGACY SOURCE SITES

There are several Legacy Source Sites co-located with T Plant including a list described above and two underground storage tanks (292-TK-1 and 292-TK-2) located near the southeast corner of the 292-T building. The tanks consist of two 208 L stainless steel drums interconnected by a single pipe of unknown material and dimension. The tanks contain an unknown mixed waste. These legacy sites are covered by another EU, the 200 Area Waste Sites: CP-LS-13 and CP-LS-15.

Cribs and drains were designed to percolate low-level liquid wastes into the soil without exposing it to air (DOE/RL-91-16, Rev. 0). Most cribs, drains, and trenches were designed to receive liquid until the unit's specific retention or radionuclide capacity was met. Cribs are shallow excavations that are either backfilled or held open by wood structures that are then covered with an impermeable layer. Occasionally, surface contamination at a crib or other waste management unit requires stabilization activities, which generally consist of removal of the contaminated soil followed by covering the excavated site with clean fill, gravel, or asphalt.

GROUNDWATER PLUMES

The saturated zone beneath the CP-OP-2 area (T Plant) currently has elevated levels of total and hexavalent chromium, carbon tetrachloride (CCl_4), I-129, nitrate, and trichloroethene (TCE) based on 2014 groundwater monitoring results (http://phoenix.pnnl.gov/apps/gw/phoenix.html). Plumes in the area are described as part of the 200-ZP GWIA (CP-GW-2 EU in Appendix D.6). Sites within the CP-OP-2 EU, including 216-T-2 Reverse well and 216-T-33 and 216-T-8 Cribs are suspected of being able to contribute mobile contaminants to the saturated zone (i.e., representing migration of contaminants from the waste site to the uppermost aquifer) (DOE/RL-92-16, Rev. 0, Table 2-2). However, CCl_4 and TCE are not reported for the CP-OP-2 wastes sites (Table H.4-5) and there is no link between the CP-OP-2 EU waste sites and 200-ZP plumes. Monitoring and treatment of groundwater is being conducted within the 200-ZP GWIA using the 200 West Area Pump and Treat Facility.

D&D OF INACTIVE FACILITIES

The 224-T facility has transitioned to D&D.

ECOLOGICAL RESOURCES SETTING

Landscape Evaluation and Resource Classification

The T Plant EU is primarily an industrial landscape covered by buildings and graveled areas surrounded by native habitats that were likely disturbed during construction of the original facility. Approximately 72% of the EU is classified as resource level 0 or level 1 (Appendix J, Table J.87). About 25% of the EU contains successional vegetation that is primarily classified as level 2 resources.

The amount and proximity of biological resources surrounding the T Plant EU were examined within the adjacent landscape buffer area, which extends 1848 ft (563 m) from the geometric center of the EU

(Appendix J, Table J.87). The buffer area encompasses parts of nearby waste sites and a waste treatment system as well as good quality level 3 habitat primarily in the northeast quadrant (Appendix J, Table J.87). Altogether, over 73% of the combined EU and adjacent landscape buffer area is classified as resource level 2 or below. Level 3 resources comprise nearly 27% of the combined area and contain plant communities dominated by big sagebrush. The buffer area northwest of the EU contains several climax communities, including big sagebrush/Sandberg's bluegrass, native grass steppe, and big sagebrush/spiny hopsage (*Grayia spinosa*) with mixed understory grasses. No resources classified as level 4 or 5 fall within the combined EU and buffer area.

Field Survey

The T Plant EU comprises the T Plant buildings and a small lawn with a few trees, all surrounded by graveled surfaces. The southeast and northeast corners of the EU contain patches of successional vegetation dominated by gray rabbitbrush (*Ericameria nauseosa*) and Sandberg's bluegrass (*Poa secunda*) (Appendix J, Table J.86). In these 2 areas, the plant community is stable and there has been little intrusion by introduced species. The circular patch of resource level 3 in the southeast corner is the location of a state sensitive species observed several years ago; this species was not noted during the May survey (Appendix J, Table J.86). Habitat in the southwest and northern most portions of the EU have a higher percent cover by introduced species and less cover of native species (Appendix J, Table J.86).

Field data records at the end of this EU description in Appendix J are of plants observed in during the survey in 2015 and wildlife observations for areas within the EU from the ECAP data in 2009 and 2010.

CULTURAL RESOURCES SETTING

Very small portions of the CP-OP-2, T Plant EU have been inventoried for archaeological resources under two archaeological surveys. It is unknown if an NHPA Section 106 review has been completed specifically for remediation of CP-OP-2 T Plant EU. It is unlikely that intact archaeological material is present in the EU, both on the surface and in the subsurface, because the soils in the EU have been extensively disturbed.

One archaeological resource has been documented within the CP-OP-2, T Plant EU, a non-contributing segment of a National Register eligible historic/ethnohistoric trail/road. A segment 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 has also been recorded within the EU. In addition, 9 National Register-eligible buildings that are contributing properties within the Manhattan Project and Cold War Era Historic District are located within CP-OP-2, T Plant EU (all 9 are contributing within the Manhattan Project and Cold War Era Historic District, 6 with individual documentation required, and 3 with no additional documentation required). In accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan (*DOE/RL-97-56), all documentation requirements have been completed for these Manhattan Project and Cold War Era Historic District properties. Additionally, T Plant (221-T) is located within the CP-OP-2, T Plant EU. This building has been selected for preservation, and HAER level documentation has been completed. Additionally, T Plant (221-T) has been identified as part of the Manhattan Project National Historic Park by the National Park Service.

Appendix K, Table 55, contains more information about the nine buildings that are National Register-eligible Manhattan Project and Cold War Era buildings located within CP-OP-2, T Plant EU.

Cultural resources documented within 500 meters of the CP-OP-2 T Plant EU include: two archaeological isolates associated with the Native American Precontact and Ethnographic Landscape. 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. In addition, 3 National Register-eligible buildings that are contributing properties within the Manhattan Project and Cold War Era Historic District (all 3 are considered contributing within the Manhattan Project and Cold War Era Historic District, 2 with individual documentation required, and one with no additional documentation required) In accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan (*DOE/RL-97-56), all documentation requirements have been completed for these Manhattan Project and Cold War Era Historic District properties..

Historic maps indicate a moderate potential for archaeological resources associated with the Pre-Hanford Early Settlers/Farming Landscape to be present within the CP-OP-2, T Plant EU. Geomorphology indicates a low to moderate potential for the presence of archaeological resources associated with the Native American Precontact and Ethnographic Landscape to be present within the CP-OP-2, T Plant EU. However, extensive ground disturbance within the entire EU suggests little to no 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 large portions of the EU have not been inventoried for archaeological resources, it may be appropriate to conduct surface (and potentially subsurface) archaeological investigation 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

CONTAMINATION WITHIN PRIMARY EU SOURCE COMPONENTS

Legacy Source Sites

The CP-OP-2 EU waste sites with reported inventories including buildings and legacy sites (i.e., cribs, a reverse well, and UPRs); inventory information is provided in Table H.4-3 through Table H.4-5.

Vadose Zone Contamination

The CP-OP-2 EU legacy waste sites that represent soil and other vadose zone contamination (including three cribs and five UPRs representing discharges to soil) are provided in Table H.4-3 through Table H.4-5. However, because the 216-T-2 is a reverse or injection well, the inventory was discharge directly to the saturated zone and not the vadose zone; this inventory is not part of the vadose zone inventory.

The inventories provided in Table H.4-3 through Table H.4-5 (minus those for building and the 216-T-2 Reverse well) represent the reported contamination originally discharged (without decay correction[36])

[36] As described in the Methodology Report (CRESP 2015a) values are typically not decay corrected because of the large uncertainties in many of the values used in the CRESP evaluations and the rough-order-of-magnitude

to the vadose zone from the CP-OP-2 EU waste sites. These values are used to estimate the inventory remaining in the vadose zone using the process described in the Methodology Report (CRESP 2015a) for the 2013 groundwater plume information as revised for the 2015 Groundwater Monitoring Data (DOE/RL-2016-09, Rev. 0) described in Appendix D.1. The focus in this section will be on the Group A and B contaminants (CRESP 2015a) in the vadose zone due to their mobility and persistence and potential threats to groundwater (a protected resource). To summarize (where current 200-ZP GWIA plumes for total and hexavalent chromium, I-129, Tc-99, CCl_4, and TCE are not associated with the T Plant EU waste sites as described below)[37] (DOE/RL-2016-09, Rev. 0):

- *Chromium* – There are reported inventories for chromium in the CP-OP-2 waste sites (Table H.4-5) and current plumes in the 200-ZP GWIA in the vicinity. The vadose inventory is distributed among the cribs and UPRs (where the dominant contribution is from the 216-T-2 Reverse well that is not part of the vadose zone). Sources for the 200-ZP plume include past leaks from SSTs and from REDOX and PUREX (200 East Area) plant operations; however, none of these sources are linked back to the CP-OP-2 EU waste sites. Using information from Section 2.5 (Appendix E.2) for chromium in the WMA T (200 West), a continuation of chromium plumes in the 200-ZP GWIA is expected during the next 150 years; it is possible that a portion these plumes would have CP-OP-2 waste sites as contributors. However, there is no information available to partition future plumes, and it is further assumed that any future contributions would be small relative to those already from WMA T and WMA TX-TY. Furthermore, the 200-ZP groundwater is being treated using the 200 West P&T Facility, which is reducing the amount of chromium in the local groundwater (Table 12-1 in DOE/RL-2016-09, Rev. 0). Thus total and hexavalent chromium are not considered significant threats to the Hanford groundwater during the first 150 years.
- *Carbon tetrachloride (CCl_4) and trichloroethene (TCE)* – There are no reported vadose zone inventories for these contaminants for the CP-LS-6 waste sites (Table H.4-5).
- *I-129* – There are very small reported inventories for I-129 (Table H.4-3) and multiple plumes in the vicinity. The vadose zone inventory is distributed across the cribs and UPRs. Plume sources include past leaks from SSTs containing metal and liquid waste and chemical processing at T Plant; however, based on the plume history, none of these sources could be definitively linked to CP-OP-2 EU waste sites[38]. Using information from Section 2.5 (Appendix E.2) for I-129 in the WMA T (200 West), a continuation of 200-ZP I-129 plumes is expected over the next 150 years, where it is possible that a portion these plumes would have CP-OP-2 waste sites as contributors. However, there is no information available to partition these future plumes and it is assumed that any future contributions would be likely negligible relative to those already from WMA TX-TY[38]. Furthermore, the 200-ZP groundwater is being treated using the 200 West P&T Facility,

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evaluations presented in the Review. One exception, for example, is when evaluating long-term impacts to groundwater for Group A and B radionuclides (e.g., Sr-90) with half-lives that are relatively short relative to the evaluation period (CRESP 2015a).

[37] The plume information is primarily taken from PHOENIX (http://phoenix.pnnl.gov/apps/gw/phoenix.html) that show the 2014 groundwater plumes. These plumes were assumed representative of 2015 groundwater plumes.

[38] The I-129 plume areas (including any possible and likely small contributions from the CP-OP-2 EU waste sites based on the reported inventory in Table H.4-3) are evaluated as part of the TX-TY Tank and Waste Farm EU (Appendix E.4). Note that the total reported I-129 inventory for the CP-OP-2 EU waste sites is several orders of magnitude lower than the I-129 inventory associated with leaks, cribs, trenches, and UPRs from the TX-TY Tank and Waste Farm EU (Appendix E.4), which is a known plume source (DOE/RL-2016-09, Rev. 0).

which is reducing the amount of I-129 in the local groundwater (Table 12-1 in DOE/RL-2016-09, Rev. 0). Thus I-129 is not considered a significant threat to Hanford groundwater during the next 150 years.

- *Tc-99* – There are small reported inventories for Tc-99 (Table H.4-4) and small plumes near the T and TX-TY tank farms. The vadose zone inventory is dominated by UPRs; however, the sources for the 200-ZP plumes were releases from leaks in single-shell tanks (SSTs) and pipelines in WMA T and WMA TX-TY and from liquid waste disposal from plutonium-processing operations to cribs and trenches adjacent to the WMAs (i.e., not part of CP-OP-2). Using information from Section 2.5 (Appendix E.2) for Tc-99 in the WMA T (200 West), a continuation of the 200-ZP Tc-99 plumes is expected over the next 150 years, where it is possible that a portion these plumes would have CP-OP-2 waste sites as contributors. However, there is no information available to partition these future plumes and it is assumed that any future contributions would be very small relative to those already from WMA T and WMA TX-TY. Furthermore, the 200-ZP groundwater is being treated using the 200 West P&T Facility, which is reducing the amount of Tc-99 in the local groundwater (Table 12-1 in DOE/RL-2016-09, Rev. 0). Thus Tc-99 is not considered a significant threat to Hanford groundwater during the first 150 years.
- *Sr-90, Uranium, and other Group A&B Primary Contaminants (PCs)* – There are no current plumes for total uranium, Sr-90, or other Group A&B PCs not mentioned above (i.e., C-14, Cl-36, or CN) in the vicinity of CP-OP-2; however, there are reported vadose zone inventories for Sr-90 (Table H.4-4), C-14 (Table H.4-3), and uranium (Table H.4-4 and Table H.4-5) but none for Cl-36 (Table H.4-3) or CN (Table H.4-5). The reported Sr-90 vadose zone inventory is dominated by 216-T-8 Crib and three UPRs. The uranium vadose zone inventory is dominated by two cribs (216-T-33 and 216-T-8) and three UPRs. The very small reported C-14 inventory is distributed among the cribs and UPRs. The majority of the Sr-90 and uranium originally discharged into the vadose zone (via cribs and UPRs) would have had to travel through much of the vadose zone to impact groundwater. Using an analysis similar to that in Section 2.5 (Appendix E.2) in the WMA T (200 West), a Sr-90 or uranium plume is not expected in the next 150 years due to retardation in the vadose zone or afterwards due to radioactive decay of Sr-90 (+97% further reduction in inventory). Thus Sr-90 and uranium (and the remaining Group A and B PCs for the reasons mentioned above) are not considered significant threats to the Hanford groundwater during the first 150 years.

Using the process outlined in Chapter 6 of the Methodology Report (CRESP 2015a) for the 2013 groundwater results as revised for the 2015 Groundwater Monitoring Data (DOE/RL-2016-09, Rev. 0) described in Appendix D.1, the remaining vadose zone inventories in Table H.4-6 are estimated by difference and used to calculate Groundwater Threat Metric (GTM) values for the Group A and B contaminants remaining in the vadose zone as illustrated in Table H.4-6. Note that the remaining vadose zone (VZ) ratings range are *Low* for all Group A and B PCs with reported inventories with the exceptions of Sr-90 and total uranium. Because there is no current Sr-90 or total uranium plume nor one expected for the next 150 years as described above, the current ratings for Sr-90 and total uranium are *Not Discernible* (*ND*). The overall current rating is defined as the highest over all the ratings and thus *Low*.

Groundwater Plumes

Waste sites within the CP-OP-2 EU are suspected of be able to contribute contamination to the saturated zone (DOE/RL-92-16, Rev. 0), and (of the Group A and B primary contaminants) chromium, C-14, Tc-99, I-129, Sr-90, and uranium have reported inventories for the CP-OP-2 sites (Table H.4-3 through Table H.4-5). Monitoring and treatment of groundwater the 200-ZP GWIA using the 200 West

P&T facility is being conducted within the 200-ZP GWIA, which is described as part of the CP-GW-2 EU (Appendix D.6). The saturated zone inventories related to the CP-OP-2 EU are provided in Table H.4-6; the process for deriving these inventories is described in CRESP Methodology Report (CRESP 2015a) originally for the 2013 groundwater plume information as revised for the 2015 Groundwater Monitoring Data (DOE/RL-2016-09, Rev. 0) described in Appendix D.1[39].

In general, the 2015 groundwater plumes are evaluated in separate EUs (see Appendix D.1 through Appendix D.6). No portions of current groundwater plumes were associated with the Group A and B PCs from the T Plant EU (DOE/RL-2016-09, Rev. 0), where the 200-ZP plumes are described in detail in the Appendix G.6 for the CP-GW-2 EU. As described in the previous section, any contributions to future plumes from CP-OP-2 waste sites would likely be subsumed in existing plumes. Note that nitrate, chromium (hexavalent), tritium (H-3), and I-129 are risk drivers (*Medium* ratings) for the 200-UP GWIA and carbon tetrachloride (*Very High*) and nitrate, tritium, and TCE (*Medium*) are risk drivers for the 200-ZP GWIA; however, there are no T Plant EU sources associated with these plumes and the remaining vadose zone sources from other EUs would drive future risks to groundwater.

Impact of Recharge Rate and Radioactive Decay on Groundwater Ratings

As described in Appendix E.2 for the CP-TF-1 (T Tank and Waste Farms) EU, the TC&WM EIS screening groundwater transport analysis (Appendix O, DOE/EIS-0391 2012) indicates that there is little impact of emplacing an engineered surface barrier (and resulting reduction of infiltrating water) on the predicted peak groundwater concentrations (relative to thresholds) at the T Barrier[40]. This result is likely due to the significant amounts of contaminants already in the groundwater and not due to an ineffective surface barrier. To summarize, the screening groundwater results at the T Barrier (Appendix O, DOE/EIS-0391 2012) include:

- Tc-99 peak concentration is 6,480 pCi/L (CY 2050) for the No Action Alternative versus 6,600 pCi/L (CY 2051) for Landfill Closure where the threshold value is 900 pCi/L.
- I-129 peak concentration is 26.1 pCi/L (CY 4560) for the No Action Alternative versus 12.6 pCi/L (CY 2050) for Landfill Closure where the threshold value of 1 pCi/L.
- Chromium peak concentration is 336 µg/L (CY 2036) for the No Action Alternative versus 353 µg/L (CY 2045) for Landfill Closure where the threshold value is 100 µg/L (total) or 48 µg/L (hexavalent).
- Uranium peak concentration is 9 µg/L (CY 11,840) for the No Action Alternative versus 1 µg/L (CY 11,843) for Landfill Closure where the threshold value is 30 µg/L (total uranium).
- No values are reported at the T Barrier for Sr-90 for either scenario, which indicates that predicted peak fluxes that were less than 1×10^{-8} Ci/yr (Appendix O, DOE/EIS-0391 2012, p. O-2).

[39] Saturated zone inventories are based on 2015 plume areas (Appendix D.1) and thus the inventory discharged to the saturated zone between 1945 and 1950 (DOE/RL-88-30, Rev. 23) via the 216-T-2 Reverse well is not shown as saturated zone inventory because the contaminants have long since dispersed through the saturated zone. There is an alternative case involving Sr-90 injected into the saturated zone via the 216-B-5 Reverse well where the plume is still present because of the retardation of Sr-90 in the Hanford groundwater.

[40] The barrier represents the edge of the infiltration barrier to be constructed over disposal areas that are within 100 meters [110 yards] of facility fence lines (DOE/EIS-0391 2012). The T Barrier is the closest to the T Plant EU. Despite including sources other than those for the T Plant EU, the analysis in the TC&WM EIS was considered a reasonable source of information to assess the potential impact of the engineered surface barrier emplacement.

Since the predicted peak concentrations remain above thresholds for Tc-99, I-129, and chromium even after surface barrier emplacement, it is decided to not alter the T Plant EU ratings related to groundwater based on different recharge rate scenarios. This effect is likely not due to an ineffective surface barrier but instead the amount of these contaminants already in the groundwater and possible contributions of sources outside the T Plant EU (used in the TC&WM EIS analysis[41]).

Columbia River

Threats to the Columbia River similar to those presented by the T Plant EU were evaluated in Section 2.5 of Appendix E.2 for CP-TF-1 (T Single-shell Tank and Waste Farm in 200 West) where all risks and potential impacts were rated *Not Discernible* (*ND*).

Operating Facilities

The following overview describes the contaminants within T Plant[42]:

The T Plant operations normally stage or store about 500 drums or 100 standard waste boxes (SWBs) at any given time at various receiving and storage areas and pads. Pieces of equipment awaiting decontamination, disposal, or storage are staged in various cells. Sludge Transport and Storage Containers (STSCs) and Large Diameter Containers (LDCs) containing radioactive sludge may be brought to the T Plant for storage. In addition, several systems at the T Plant, such as decontamination waste systems and ventilation systems including high-efficiency particulate air (HEPA) filters, are contaminated with radioactive material.

Mixed waste containers contain varying amounts of hazardous chemicals, including corrosive, reactive, and toxic materials. The hazardous material inventory in Appendix D of the Preliminary Hazards Analysis (PHA) indicates the presence of large amounts of caustics and acids. There are three hazardous material storage modules at T Plant for segregated storage of some of these hazardous materials.

Flammable and combustible liquids associated with T Plant operations are fuels used in transportation vehicles such as trucks and forklifts. Hydrogen and other flammable gases can be generated or contained in waste packages. There are also cylinders of flammable gases on delivery trucks, as well as cylinders of flammable gases stored on the dock.

The primary combustibles are the waste itself, wooden containers, liners, and the combustible items associated with occupying the facility (e.g., documents, furniture, and wiring). Brush and grasses are present in the area, so the contribution of vegetation to the combustible loading is considered and controlled.

At present, the maximum possible inventory is: 41,632 DE-Ci. Soon, T Plant will be used for intermediate storage of K Basins Sludge from the Sludge Treatment Project. With the addition of the STSCs and LDCs from the Sludge Treatment Project, the maximum possible inventory is: 93,152 DE-Ci.

The inventory for T Plant (WIDS 221-T) was derived from a survey of the Solid Waste Information and Tracking System (SWITS) database in June 2016[43]. It is assumed that this is typical of current inventories, though it is understood that the inventories will change as material is processed through the facility. The

[41] Analyses specific to each Tank Farm or Central Plateau EU are not available; thus the aggregate screening analysis provided in the TC&WM EIS was used as an indication.

[42] HNF 14741-10 Page 3-33-3-34

[43] HNF-9668-2014 (SWITS request 2016 05)

inventory was described in the SWITS response as “T Plant” and is assumed for the purposes of this analysis to be in the canyon building (WIDS 221-T) through other facilities may be involved. The inventory is not considered in the groundwater threat metric analysis because it is assumed to be contained within at least two uncompromised barriers: 1) a suitable container or containers and 2) a building.

Table H.4-**3. Inventory of Primary Contaminants** [a]

WIDS	Description	Decay Date	Ref[b,c,d]	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			34	0.012	0.0	0.24	760	0.0011	0.10	1.4	0.00032
TRUSAF	Infrastructure Building	1985	EIS-S	5.0	NR	NR	NR	1.1	NR	NR	NR	NR
221-T	Infrastructure Building		SWITS	11	2.5E-09	0.0	0.23	51	0.00022	0.036	0.0064	0.0
200-W-45	Process Building	1994	EIS-S	NR	NR	NR	NR	33	NR	NR	NR	NR
224-T	Process Building	2003	EIS-S	19	NR	NR	NR	NR	NR	NR	NR	NR
216-T-29	Cribs	2001	SIM	0.0000066	0.00000088	NR	0.0000010	0.042	6.9E-08	0.0000052	0.000046	1.9E-08
216-T-33	Cribs	2001	SIM	0.000079	0.0000012	NR	0.0000080	0.073	0.0000012	0.000089	0.77	0.000029
216-T-8	Cribs	2001	SIM	0.000076	0.000079	NR	0.0000084	0.44	0.00000070	0.000052	0.00044	0.00000022
216-T-2	Reverse well	2001	SIM	0.0010	0.00014	NR	0.00016	6.5	0.000011	0.00082	0.0071	0.0000029
200-W-9	UPR	2001	SIM	0.000023	0.0000031	NR	0.0000036	0.15	0.00000024	0.000018	0.00016	6.6E-08
UPR-200-W-2	UPR	2001	SIM	0.010	0.0038	NR	0.0019	170	0.000082	0.0079	0.14	0.000037
UPR-200-W-21	UPR	2001	SIM	0.051	0.0048	NR	0.0053	290	0.00046	0.034	0.29	0.00015
UPR-200-W-38	UPR	2001	SIM	0.036	0.0033	NR	0.0037	200	0.00032	0.024	0.20	0.00010
UPR-200-W-98	UPR	2001	SIM	0.00028	0.00010	NR	0.000050	4.6	0.0000022	0.00021	0.0038	0.0000010

a. NR = Not reported
b. EIS-S = DOE/EIS-0391 2012
c. SIM = RPP-26744, Rev. 0
d. SWITS = HNF-9668-2014 (SWITS request 2016 05)

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

WIDS	Description	Decay Date	Ref[b, c, d]	Ni-59 (Ci)	Ni-63 (Ci)	Pu (total) (Ci)	Sr-90 (Ci)	Tc-99 (Ci)	U (total) (Ci)
All	Sum			0.0041	0.32	51	180	0.31	0.21
TRUSAF	Infrastructure Building	1985	EIS-S	NR	NR	31	22	NR	NR
221-T	Infrastructure Building		SWITS	0.00041	0.00036	NR	31	0.00038	NR
200-W-45	Process Building	1994	EIS-S	NR	NR	4.1	29	NR	NR
224-T	Process Building	2003	EIS-S	NR	NR	1.7	NR	NR	NR
216-T-29	Cribs	2001	SIM	0.00000026	0.000025	0.000028	0.0051	0.000019	0.0000013
216-T-33	Cribs	2001	SIM	0.000011	0.0011	14	0.060	0.0041	0.16
216-T-8	Cribs	2001	SIM	0.0000023	0.00021	0.0015	15	0.00019	0.032
216-T-2	Reverse well	2001	SIM	0.000041	0.0039	0.0044	0.79	0.0029	0.00020
200-W-9	UPR	2001	SIM	0.00000092	0.000087	0.000099	0.018	0.000067	0.0000046
UPR-200-W-2	UPR	2001	SIM	0.0010	0.087	0.056	30	0.084	0.0079
UPR-200-W-21	UPR	2001	SIM	0.0015	0.13	0.081	27	0.13	0.0072
UPR-200-W-38	UPR	2001	SIM	0.0011	0.093	0.056	19	0.089	0.0050
UPR-200-W-98	UPR	2001	SIM	0.000027	0.0023	0.0015	0.81	0.0023	0.00021

a. NR = Not reported
b. EIS-S = DOE/EIS-0391 2012
c. SIM = RPP-26744, Rev. 0
d. SWITS = HNF-9668-2014 (SWITS request 2016 05)

Table H.4-**5. Inventory of Primary Contaminants (cont)**[a]

WIDS	Description	Ref[b, c, d]	CCl4 (kg)	CN (kg)	Cr (kg)	Cr-VI (kg)	Hg (kg)	NO3 (kg)	Pb (kg)	TBP (kg)	TCE (kg)	U (total) (kg)
All	Sum		0.0	0.0	2,600	2,600	0.0063	62,000	180	0.0	0.0	140
TRUSAF	Infrastructure Building	EIS-S	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
221-T	Infrastructure Building	SWITS	0.0	0.0	0.0037	0.0037	0.0	0.0	180	0.0	0.0	0.0
200-W-45	Process Building	EIS-S	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
224-T	Process Building	EIS-S	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
216-T-29	Cribs	SIM	NR	NR	0.035	0.035	0.00000065	1.2	NR	NR	NR	0.0019
216-T-33	Cribs	SIM	NR	NR	22	22	0.00018	1,300	NR	NR	NR	60
216-T-8	Cribs	SIM	NR	NR	21	21	NR	490	NR	NR	NR	48
216-T-2	Reverse well	SIM	NR	NR	2,500	2,500	NR	58,000	NR	NR	NR	0.30
200-W-9	UPR	SIM	NR	NR	57	57	NR	1,300	NR	NR	NR	0.0067
UPR-200-W-2	UPR	SIM	NR	NR	2.2	2.2	NR	140	NR	NR	NR	12
UPR-200-W-21	UPR	SIM	NR	NR	2.1	2.1	0.0036	130	NR	NR	NR	11
UPR-200-W-38	UPR	SIM	NR	NR	1.4	1.4	0.0025	87	NR	NR	NR	7.3
UPR-200-W-98	UPR	SIM	NR	NR	0.060	0.060	NR	3.8	NR	NR	NR	0.31

a. NR = Not reported
b. EIS-S = DOE/EIS-0391 2012
c. SIM = RPP-26744, Rev. 0
d. SWITS = HNF-9668-2014 (SWITS request 2016 05)

Table H.4-**6. Summary of the Evaluation of 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	0.23	0	1.84	1.22E-02 Ci	---	---	1.22E-02 Ci	6.10E-03	*Low*
I-129	A	1 pCi/L	0.23	0.2	1.84	3.18E-04 Ci	---	---	3.18E-04 Ci	1.22E-01	*Low*
Sr-90	B	8 pCi/L	0.23	22	1.84	9.40E+01 Ci	---	---	9.40E+01 Ci	6.64E+01	*ND*[e]
Tc-99	A	900 pCi/L	0.23	0	1.84	3.10E-01 Ci	---	---	3.10E-01 Ci	3.45E-01	*Low*
CCl_4	A	5 µg/L	0.23	0	1.84	---	---	---	---	---	*ND*
Cr	B	100 µg/L	0.23	0	1.84	1.1E+02 kg[f]	---[f]	---	1.1E+02 kg[f]	1.06E+00	*Low*
Cr-VI	A	48 µg/L[b]	0.23	0	1.84	1.1E+02 kg[f]	---[f]	---	1.1E+02 kg[f]	2.21E+00	*Low*
TCE	B	5 µg/L	0.23	2	1.84	---	---	---	---	---	*ND*
U(tot)	B	30 µg/L	0.23	0.8	1.84	1.38E+02 kg	---	---	1.38E+02 kg	6.21E-01	*ND*[e]

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

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 2015).

e. As discussed in **Part V**, no appreciable total uranium or Sr-90 plume would be expected in the next 150 years due to transport and decay considerations. Thus the *Low* rating would apply to the period at the end of the Active Cleanup is complete to account for uncertainties.

f. The 216-T-2 Reverse well inventory, which is a large percentage of the total for only chromium, is excluded from both the vadose and saturated zone estimates as described in **Part V**.

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[44]?

There are several events that have a high impact on the co-located person and the facility worker. These include: a T Plant Perma-con Fire in 221-T, and a large fire, designed using WRAP, but also applicable at T Plant. There are several events that have a high anticipated impact on the co-located person and the facility worker. These include: T Plant Small Inside Fire in 221-T, the T Plant Large Inside Fire, the SWOC Medium Inside Fire modeled for WRAP but also applicable at T Plant, a T Plant Spill Event, a T Plant Criticality Event, and the Design Basis Earthquake. With mitigation, all events are postulated to have a low consequence to the facility worker and the co-located person. [45]

All events postulated for T Plant have a low consequence rating to the public.

2. Active safety class and safety significant systems and controls[46]

Fire Suppression Systems in 2706-T & TA: Mitigate the effects of fires, thus reducing or limiting the potential release of radioactive and hazardous material

Ventilation systems—Active HEPA filter air (221-T, 2706-T & TA) and Building structure confinement boundary including associated exhaust HEPA filters (221-T Canyon, 2706-T & TA) - Mitigate release to the environment by capturing radioactive particulates thus reducing amount of material available for release through other pathways. Also maintains relative negative pressure differential with adjoining areas and the environment.

3. Passive safety class and safety significant systems and controls[47]

Building Structure (221T): Maintain structural integrity during and following natural phenomena events (221T only) and other accident analysis assumptions.

Container Vent: Prevent accumulation of combustible quantities of flammable gas and overpressurization.

Large Diameter Container Design: Provide a container capable of resisting both thermal and mechanical insults associated with waste operations and preventing over-pressurization.

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[44] HNF 14741 Pages xiv-xix
[45] HNF 14741 xiv-xix
[46] HNF 14741-10 Page 4-12-4-15
[47] HNF 14741-10 Page 4-12-4-15

Container Venting Systems: Prevent ejection of bulk waste from high-risk waste containers resulting from a deflagration, minimize the likelihood of a deflagration event, and protect workers from hazards associated with the potential impact from the waste container lid during waste container venting. Credited venting system features such as cold drilling or non-sparking tools are features that must be protected for the system operation.

Overpack Drum: Prevent ejection of bulk waste from the waste container in the event a deflagration occurs during venting. Provide industrial safety for the immediate worker.

221T Head End/Metal Wall: The corrugated sheet metal wall will isolate the Head End from the 221-T Canyon during the time the overhead rollup door is open for operational activities, such as bringing waste containers and supplies into the Head End staging area. During this time the metal wall supports the active ventilation system.

Near-term Future:

STSC: This STSC is a robust container that has physical components and configurations capable of minimizing the potential for fire, deflagration, over-pressurization, and spills events.

STS: The STS cask is an engineered passive system with venting capability that supports the prevention of deflagration and spill events.

Nitrogen Purge System: The NPS is used to vent or purge the STS cask and STSC headspace volumes. The NPS provides a means for release of gases generated within the STS Cask and STSC headspace to the outside atmosphere, minimizing the potential for fires/explosions, and over-pressurization events.

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?

There are three major types of barriers to release of contamination from the primary facility: (1) Engineered systems including the waste container, and secondary containment systems (buildings, berms, sumps, etc.); (2) Operating Procedures such as Waste Acceptance Criteria, Venting Programs, RCRA and radiological inspections, and others; and (3) Safety Management Systems such as radiation protection, nuclear criticality safety, and transportation safety.

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

The initiating events that may lead to degradation or failure of the barriers include: worker accidents, loss of institutional controls, loss of engineering controls, structural decay or failure, wild fire or facility fire, earthquake, dam failure, ash fall and plane crash; these are evaluated in the DSA (HNF-14741).

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

The primary pathway of concern is airborne dispersion of material from containerized waste; the populations at risk from this source include workers (on site and non-collocated).

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

For all initiating events, because the primary pathway to the receptors is airborne, the time frame to human exposure or impacts will be very short, on the order of hours, days or weeks.

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

There is a completed pathway to the facility worker through occupational exposure.

POPULATIONS AND RESOURCES CURRENTLY AT RISK OR POTENTIALLY IMPACTED

Facility Worker

Workers are the resource impacted by the only current completed pathway of occupational radiation exposure. In the instance of the initiating events described above, any exposure would likely be airborne dispersion of waste and exposure via inhalation or external radiation due to proximity to contamination.

Co-Located Person (CP)

See above. Co-located persons also could receive occupational radiation exposure.

Public

The public is at a low level of risk if airborne dispersion were to occur.

Groundwater

Table H.4-6 represents the risks and associated ratings for the saturated zone (groundwater) from vadose zone contamination associated with the CP-OP-2 legacy waste sites. Sites within the CP-OP-2 EU have contaminated the vadose zone and are suspected of being able to contribute mobile contaminants to the saturated zone (DOE/RL-92-16, Rev. 0, Table 2-2); waste was also directly discharged into the saturated zone between 1945 and 1950 via the 216-T-2 Reverse well. Monitoring and treatment of groundwater is being conducted within the 200-ZP GWIA using 200 West Pump and Treat Facility, which is described as part of the CP-GW-2 EU (Appendix D.6). No 200-ZP plumes have been associated with CP-OP-2 EU waste sites.

Additional threats to groundwater could emerge if a leak were to occur in a package or from the underground storage tanks.

Columbia River

The Columbia River is protected by its distance from the Central Plateau. As described in Appendix D.6 (CP-GW-2 EU, **Part V**), no plumes from the 200 West Area (that includes the CP-OP-2 waste sites) currently intersect the Columbia River, thus current ratings for all contaminants for the benthic, riparian, and free-flowing ecology are ND.

Ecological Resources

Remove, Treat and Dispose of waste involves personnel through the target (remediation) area, car and pickup truck traffic through the non-target and target (remediation) area, truck, heavy equipment (including drill rigs) traffic on roads through the non-target and target area, caps (and other containment), soil removal and contamination in the soil, vegetation control, and irrigation (for revegetation) will cause the following disturbance from remediation activities: Carry seeds or

propagules (pieces of vegetation or other biological parts that can grow and/or reproduce) on tires of vehicles or blowing from heavy equipment; injure or kill vegetation or small invertebrates or small animals; vehicle traffic can make paths, compact soil, scare or displace animals, can impact animal behavior or reproductive success; affect animal dispersion and habitat use (e.g., some birds avoid nesting near roads because of song masking); displacement of animals from near roads due to increased noise or other disturbances; and heavy equipment may permanently destroy areas of the site with intense activity. Soil removal can cause more severe effects because of blowing soil (and seeds). During remediation, radionuclides or other contaminants could be released or spilled on the surface, and depending upon the type and quantity, could have adverse effects on the plants and animals on-site. Use of non-specific herbicides for vegetation control results in some mortality of native vegetation (especially native forbes), and allows exotic species to move in; it may change species composition of native communities, but it also could make it easier for native species to move in; improved methods could yield positive results. Irrigation requires a system of pumps and water, resulting in physical disturbance; repeated irrigation from the same locations could result in some soil compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area.

Alternatively, barriers could be the remediation option. Personnel car and pickup truck traffic through the non-target and target (remediation) area, truck and heavy equipment traffic on roads through the non-target and target area, dust suppression, and irrigation (for revegetation) will cause the following disturbance from remediation activities: Carry seeds or propagules (pieces of vegetation or other biological parts that can grow and/or reproduce) on person (boots, clothes, equipment) or tires of vehicles or blowing from heavy equipment; injure vegetation or small invertebrates or small animals (e.g., insects, snakes); make paths or compact soil; scare or displace animals. Caps and other containment can cause compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. Destruction of soil invertebrates are at depths of pits. Potential bringing up of dormant seeds from soil layers; disruption of ground-living small mammals and hibernation sites of snakes and other animals on-site of containment; often disrupts local aquatic environment and drainage; often non-native plants used on caps (which can become exotic/alien adjacent to the containment site). Additional water from dust suppression could lead to more diverse and abundant vegetation in areas that receive water, which could encourage invasion of exotic species; the latter could displace native plant communities; excessive dust suppression activities could lead to compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. Irrigation requires a system of pumps and water, resulting in physical disturbance; repeated irrigation from the same locations could result in some soil compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. These effects will be higher in the EU itself.

Cultural Resources

Potential direct effects are possible from personnel, car, pick-up, truck and heavy equipment traffic/use through both target (remediation) and non-target areas during active cleanup. These activities may inadvertently expose resources close to the surface. Additionally, traffic through these areas may lead to the introduction of invasive species and/or a decrease in the presence of native plants used for medicinal or tribal religious purposes. Heavy equipment use for remedial activities (such as soil removal, remediation of contaminated soils, etc.) may lead to an alteration of the landscape, and the act of soil removal may destroy resources; if resources are not destroyed, then, soil removal may disturb or adversely affect resources. Utilization of caps, barriers and/or other containments may destroy

resources located close to the surface. If resources are not destroyed, containments may disturb or adversely affect resources. Lastly, during remediation, radionuclides or other contamination released or spilled on the surface could have long-term effects if the contamination remains and resources become contaminated and/or plants having cultural importance to Tribes do no recolonize or thrive.

Potential indirect effects are possible from personnel traffic through target (remediation) areas as well as car, pick-up, truck and heavy equipment traffic/use through both target (remediation) and non-target areas. It is possible that these activities may decrease viewshed values and/or impact viewshed through the introduction of increased dust, the creation of trails, etc. Heavy equipment use for remedial actions/soil removal and the utilization of caps and/or other containments (i.e. barriers) could potentially cause alterations to the landscape and im pacts to viewsheds. Lastly, during remediation, radionuclides or other contamination released or spilled on the surface could have long-term effects if the contamination remains and resources become contaminated and/or plants having cultural importance to Tribes do no recolonize or thrive.

CLEANUP APPROACHES AND END-STATE CONCEPTUAL MODEL

Selected or Potential Cleanup Approaches

T Plant will remain operational and perform any of the activities related previously until the disposition of all of the Hanford Waste is accomplished.

Contaminant Inventory Remaining at the Conclusion of Planned Active Cleanup Period

The contaminant inventory at the conclusion of the planned active cleanup period is dependent on the D&D methods used on the rest of the Hanford Site.

Risks and Potential Impacts Associated with Cleanup

The addition of the sludge inventory to T Plant, during its storage there, does bring additional risk and potential impact due to the increase in inventory of TRU.

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

Facility Worker

Dependent on D&D methodology, to be determined.

Co-located Person

Dependent on D&D methodology, to be determined.

Public

Dependent on D&D methodology, to be determined.

Groundwater

As described in **Part V**, there will be a continuing threat during this period to groundwater (as a protected resource) from mobile primary contaminants in the T Plant legacy sites. These and additional threats and impacts to groundwater are described in more detail in Appendix G.6 for the CP-GW-2 EU. Furthermore, there are contaminant sources (legacy source sites) in the vadose zone that pose continuing risk to groundwater (via the vadose zone). The vadose zone (VZ) GTM values for the Group A and B primary contaminants for the T Plant EU translate to ratings of *Low* for PCs with reported

inventories (to represent uncertainty). As indicated in **Part V**, Sr-90 and total uranium are unlikely to impact the groundwater in sufficient quantities to exceed the drinking water standard and thus are not considered a significant future threat. These ratings correspond to an overall rating of *Low* for both the Active and Near-term, Post-Cleanup periods to account for uncertainties. The 200 West Area P&T system in the 200-ZP GWIA is assumed to be operational during this evaluation period, which will be treating groundwater contamination in the 200 West area.

It is considered unlikely that additional groundwater resources would be impacted as a result of either interim remedial actions (e.g., pump and treat) or final closure activities (that are not covered in the Ecological or Cultural Resources results).

Columbia River

As described in **Part V**, impacts to the Columbia River benthic, riparian, and free-flowing ecology for the Active Cleanup and Near-term, Post Cleanup periods are rated as *Not Discernible* (*ND*). Additional information on groundwater plumes and potential threats associated with sources including those from the T Plant waste sites are described in Appendix G.6 for the CP-GW-2 EU (200-ZP GWIA).

It is considered unlikely that additional benthic or riparian resources would be impacted as a result of either interim remedial actions (e.g., pump and treat) or final closure activities (that are not covered in the Ecological or Cultural Resources results).

Ecological Resources

Remove, Treat and Dispose of waste involves personnel through the target (remediation) area, car and pickup truck traffic through the non-target and target (remediation) area, truck, heavy equipment (including drill rigs) traffic on roads through the non-target and target area, caps (and other containment), soil removal and contamination in the soil, vegetation control, and irrigation (for revegetation) will cause the following disturbance from remediation activities: Carry seeds or propagules (pieces of vegetation or other biological parts that can grow and/or reproduce) on tires of vehicles or blowing from heavy equipment; injure or kill vegetation or small invertebrates or small animals; vehicle traffic can make paths, compact soil, scare or displace animals, can impact animal behavior or reproductive success; affect animal dispersion and habitat use (e.g., some birds avoid nesting near roads because of song masking); displacement of animals from near roads due to increased noise or other disturbances; and heavy equipment may permanently destroy areas of the site with intense activity. Soil removal can cause more severe effects because of blowing soil (and seeds). During remediation, radionuclides or other contaminants could be released or spilled on the surface, and depending upon the type and quantity, could have adverse effects on the plants and animals on-site. Use of non-specific herbicides for vegetation control results in some mortality of native vegetation (especially native forbes), and allows exotic species to move in; it may change species composition of native communities, but it also could make it easier for native species to move in; improved methods could yield positive results. Irrigation requires a system of pumps and water, resulting in physical disturbance; repeated irrigation from the same locations could result in some soil compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area.

Alternatively, barriers could be the remediation option and involves personnel car and pickup truck traffic through the non-target and target (remediation) area, truck and heavy equipment traffic on roads through the non-target and target area, dust suppression, and irrigation (for revegetation) will cause the following disturbance from remediation activities: Carry seeds or propagules (pieces of vegetation or other biological parts that can grow and/or reproduce) on person (boots, clothes, equipment) or tires of vehicles or blowing from heavy equipment; injure vegetation or small invertebrates or small animals (e.g., insects, snakes); make paths or compact soil; scare or displace animals. Caps and other containment can cause compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. Destruction of soil invertebrates at depths of pits. Potential bringing up of dormant seeds from soil layers; disruption of ground-living small mammals and hibernation sites of snakes and other animals on-site of containment; often disrupts local aquatic environment and drainage; often non-native plants used on caps (which can become exotic/alien adjacent to the containment site). Additional water from dust suppression could lead to more diverse and abundant vegetation in areas that receive water, which could encourage invasion of exotic species; the latter could displace native plant communities; excessive dust suppression activities could lead to compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. Irrigation requires a system of pumps and water, resulting in physical disturbance; repeated irrigation from the same locations could result in some soil compaction, which can decrease plant growth in those areas, decrease abundance and diversity of soil invertebrates, and prevent fossorial snakes or mammals from using the area. These effects will be higher in the EU itself.

Cultural Resources

Potential direct effects are possible from personnel, car, pick-up, truck and heavy equipment traffic/use through both target (remediation) and non-target areas during active cleanup. These activities may

inadvertently expose resources close to the surface. Additionally, traffic through these areas may lead to the introduction of invasive species and/or a decrease in the presence of native plants used for medicinal or tribal religious purposes. Heavy equipment use for remedial activities (such as RTD of waste and/or contaminated soils) may lead to an alteration of the landscape, and the act of soil removal may destroy resources; if resources are not destroyed, then, soil removal may disturb or adversely affect resources. Utilization of caps, barriers and/or other containments may destroy resources located close to the surface. If resources are not destroyed, containments may disturb or adversely affect resources. Lastly, during remediation, radionuclides or other contamination released or spilled on the surface could have long-term effects if the contamination remains and resources become contaminated and/or plants having cultural importance to Tribes do no recolonize or thrive.

Potential indirect effects are possible from personnel traffic through target (remediation) areas as well as car, pick-up, truck and heavy equipment traffic/use through both target (remediation) and non-target areas. It is possible that these activities may decrease viewshed values and/or impact viewshed through the introduction of increased dust, the creation of trails, etc. Heavy equipment use for remedial actions/soil removal and the utilization of caps and/or other containments (i.e. barriers) could potentially cause alterations to the landscape and impacts to viewsheds. Lastly, during remediation, radionuclides or other contamination released or spilled on the surface could have long-term effects if the contamination remains and resources become contaminated and/or plants having cultural importance to Tribes.

ADDITIONAL RISKS AND POTENTIAL IMPACTS IF CLEANUP IS DELAYED

T Plant as a part of the Solid Waste Operations Division has a mission life that extends beyond the cleanup of the rest of the site. However, delays in the waste package surveillance program, or extended delays in the ultimate disposition of the waste may result in the degradation of the waste packages, which would lead to increased potential for leaks and exposure of workers or co-located persons.

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

T Plant will receive the sludge from the Sludge Treatment Project and continue safe storage of this and other materials until a disposition pathway is decided upon and the waste is disposed. The near-term post cleanup status is therefore similar to present conditions but with the addition of K Basins Sludge in selected cells but only in the 221-T building, and the associated revised surveillance and maintenance of this material.

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

Table H.4-7. Summary of Populations and Resources at Risk or Potentially Impacted after Cleanup.

Population or Resource		Risk/Impact Rating	Comments
Human	Facility Worker	IS	
	Co-located Person	IS	
	Public	IS	
Environmental	Groundwater (A&B) from vadose zone[(a)]	*Low* (Group A&B PCs) **Overall**: *Low*	*Current* GTM values for Group A&B primary contaminants (Table H.4-6): *ND* (Sr-90 and U(tot)) and *Low* (other A&B PCs with reported inventories). Sr-90 and uranium not likely to impact groundwater (**Part V**). Any impact from changes in recharge rates to adjust ratings were not taken into account to address uncertainties (and since ratings were already *Low*).
	Columbia River from vadose zone[(a)]	Benthic: *ND* Riparian: *ND* Free-flowing: *ND* Overall: *ND*	TC&WM EIS screening results indicate that exposure to radioactive and chemical contaminants from peak groundwater discharge below benchmarks for both benthic and riparian receptors (Part V). Dilution factor of greater than 100 million between Columbia River and upwellings.
	Ecological Resources[(b)]	ND to Low	Monitoring activities for entombment are expected to occur away from any level 3 resources.
Social	Cultural Resources[(b)]	**Native American** Direct: Unknown Indirect: Known **Historic Pre-Hanford** Direct: Known Indirect: None **Manhattan/Cold War** Direct: Unknown 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 the EU and 500 meters of the EU will be demolished, but they have already been mitigated. T-Plant has been identified as eligible for inclusion in the Manhattan Project National Historical Park.

a. Threat to groundwater or Columbia River for Group A and B contaminants remaining in the vadose zone. Threats from existing plumes associated with the T Plant EU are described in **Part V** with more detailed evaluation in Appendix G.6 (CP-GW-2). No current plumes have been associated with CP-OP-2 EU waste sites.

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.

EU Designation: T Plant (CP-OP-2, Central Plateau)

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

There is currently no plan for long-term post cleanup at T Plant. The inventories and associated risks in this time frame will be dependent on D&D activities which are not yet planned.

PART VII. SUPPLEMENTAL INFORMATION AND CONSIDERATIONS

N/A

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