

APPENDIX G.11

BC CONTROL ZONE (CP-LS-17 CENTRAL PLATEAU) EVALUATION UNIT SUMMARY TEMPLATE

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PART I. EXECUTIVE SUMMARY

EU LOCATION

The BC Controlled Area (CP-LS-17) is located south of the 200 East Area (in what is commonly called the 600 area) near the center of the Hanford Site and lies between Route 4S and the Army Loop Road. Route 4S is to the north and east of the BC Controlled Area, and the Columbia River is approximately 11.5 km (7 mi.) to the north-northeast of the BC Controlled Area.

RELATED EUS

CP-LS-1 (BC Cribs & Trenches)

PRIMARY CONTAMINANTS, CONTAMINATED MEDIA AND WASTES¹

The contamination in the BC Controlled Area (UPR-200-E-83) was the result of animal and plant (i.e., tumbleweed) intrusion and wind dispersion from the BC Cribs and Trenches. The BC Cribs and Trenches are separate waste sites and are discussed in the CP-LS-1 Evaluation Unit (Appendix G.5). The BC Cribs and Trenches were constructed in 1955 and received radioactive discharges of waste from two general sources: the uranium recovery project and 300 Area wastes, with the majority of the waste coming from the uranium recovery project.

The primary radionuclides found in the BC Controlled Area (BCCA) soils were cesium (Cs-137) and strontium (Sr-90), and to a lesser extent Plutonium (Pu-239/240). Sampling in 1999 showed that strontium surface soil concentrations range from 0.32 to 3420 pCi/g across the northern part of the BCCA. Cs-137 surface soil concentrations range from 0.35 to 2290 pCi/g across the area. Analytical data from calendar years 2005 and 2007 showed that the bulk of activity in areas with contamination caused by biological transport mechanisms (i.e., spread from animals) is primarily in the top 15 cm (6 in.) of the surface layer of soil, but is deeper in some areas. A 140 acre area designated as Zone A was identified as having the highest continuous radiological contamination over the 200-UR-1 OU radionuclide soil cleanup preliminary remediation goals (PRGs) and presenting the greatest risk to human health and the environment. Zone A is located directly south of the BC Cribs and Trenches area and is included in the CP-LS-1 (BC Cribs and Trenches) EU.

The 3,660 acre balance of the northern section of UPR-200-E-83 was designated as Zone B and was primarily contaminated by non-biological mechanisms (i.e., windblown plant and soil contamination). The radionuclides are believed to be in the top 2.5 cm (1 in.) of the surface layer of soil, with the exception of Sr-90, which is distributed about 15 cm (6 in.) deep, based on sample results. The top 2.5 cm (1 in.) layer is expected to contain about 40 percent of the strontium-90. A total of approximately 20,000 tons of contaminated soil was removed from Zone B during the spring of 2010. This resulted in the removal of approximately 15 ac of contaminated spots. Because the original funding was limited to accomplishing the removal of 15 ac of contaminated soil, soil removal in Zone B was suspended after the completion of this scope. Contaminated spots have been investigated and accurately posted in the

¹ *Action Memorandum for the Non-Time Critical Removal Action for the Northern Part of the BC Controlled Area (UPR-200-E-83)*, DOE/RL-2008-21, Rev 0, US Department of Energy, May 2008.

majority of the area outside the firebreak roads. This resulted in the down-posting of more than 1,680 ac from Contamination Area or Soil Contamination Area postings to no radiological postings.

Recent radiological surveys concluded that contamination levels in the southern part of the BC Controlled Area (Zone C), the region south of and including the sand dunes, were not sufficient to warrant classification as a Soil Contamination Area.¹

BRIEF NARRATIVE DESCRIPTION

As noted above, the area to the south of the BC Cribs and Trenches became contaminated through animal and plant (i.e., tumbleweed) intrusion and wind dispersion from the BC Cribs and Trenches. Characterization activities from 1973-1988 showed varying amounts of Cs-137 with the highest level of contamination in the area south of the BC Trenches; an arm of the contaminated area extending toward the southeast; an arm of the contamination extending toward the southwest; a contaminated area to the west and contamination to the south and extending into the dunes (sparse contamination) that run generally east to west (see Figure G.11-3). Extensive studies in 1975 concluded that the major risk was from a range fire with related large aerial dispersal of radiological contaminants, but that it wasn't serious enough to warrant the site being cleaned up. However, the BC Crib and Trench area was stabilized, covered with 2 feet of clean fill and reseeded to resist tumbleweed growth and further spread of contaminants in 1981-1982.²

Early in 1997, additional surveys determined that either many contaminated spots would have to be posted as radiologically controlled areas or a larger area containing the contaminated spots would need to be established. Based on these findings, the area bounded by the Army Loop Road was established as the BC Controlled Area. This action expanded the posted area south of the BC Cribs and Trenches from approximately 4 mi² to approximately 13.4 mi². This area was designated as unplanned release site UPR-200-E-83 and established as the BC Controlled Area (BCCA).

A final remedial decision for the 200-UR- 1 OU has not been made; however in 2008, CERCLA radioactive hazardous substances in the northern part of the BC Controlled Area were found to present a potential threat to human health and the environment to the extent that a removal action³ was warranted before a final remedial decision is documented. A 140 acre area designated as Zone A was identified as having the highest continuous radiological contamination over the PRGs and presenting the greatest risk to human health and the environment. Zone A is located directly south of the BC Cribs and Trenches area and is included in the CP-LS-1 (BC Cribs and Trenches) EU. The 3,660 acre balance of the northern section of UPR-200-E-83 was designated as Zone B and is included in this EU risk analysis along with the equally large area in the southern section of UPR-200-E-83 that is designated as Zone C (See Figures G.11-1 and 2).

Removal of the contaminated soils in Zone A began in 2008 and was completed in 2011. Approximately 483,000 tons of contaminated soil was removed and the area was revegetated with seed and about 280,000 pounds of mulch. A total of approximately 20,000 tons of contaminated soil was removed from Zone B during the spring of 2010. This resulted in the removal of approximately 15 ac of contaminated spots. Because the original funding was limited to accomplishing the removal of 15 ac of contaminated soil, soil removal in Zone B was suspended after the completion of this scope.

² *Historical Site Assessment of the Surface Radioactive Contamination of the BC Controlled Area*, WMP-18647, Revision 0, Flour Hanford, May 2004.

³ *Removal Action Work Plan for the Northern Part of the BC Controlled Area (UPR-200-E-83) Located Within the 200-UR-1 Operable Unit*, DOE/RL-2008-22, US Department of Energy, June 2008.

SUMMARY TABLES OF RISKS AND POTENTIAL IMPACTS TO RECEPTORS

Table G.11-1 provides a summary of nuclear and industrial safety related risks to humans and impacts to important physical Hanford site resources.

Human Health

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

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 Resources⁴

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 Resources⁴

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

⁴ 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 G.11-1. Risk Rating Summary (for Human Health, unmitigated nuclear safety basis indicated, mitigated basis indicated in parentheses (e.g., “Very High” (Low))).

Population or Resource		Evaluation Time Period	
		Active Cleanup (to 2064)	
		Current Condition: Inactive Posted	From Cleanup Actions: Final D&D
Human Health	Facility Worker	Low-ND	Low-ND
	Co-located Person	ND	ND
	Public	ND	ND
Environmental	Groundwater ^(a)	ND	ND
	Columbia River ^(a)	ND	ND
	Ecological Resources ^(b)	Low	Very High
Social	Cultural Resources ^(b)	Native American Direct: Known Indirect: Known Historic Pre-Hanford Direct: Known Indirect: Known Manhattan/Cold War Direct: Known Indirect: Known	Native American Direct: Known Indirect: Known Historic Pre-Hanford Direct: Known Indirect: Known 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 2015) remaining in the vadose zone. There are no vadose zone inventories associated with this EU and thus no threat to the vadose zone, groundwater, or the Columbia River.
- 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.

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

Current⁵

A total of approximately 20,000 tons of contaminated soil was removed from the B Zone during the spring of 2010. This resulted in the removal of approximately 15 ac of contaminated spots. Remediated spots were surveyed post remediation to ensure that residual levels were below posting requirements. Other contaminated spots were investigated and accurately posted in the majority of the area outside

⁵ On Scene Coordinator Report FY2010 and FY2011: BC Controlled Area (Waste Site UPR-200-E-83) Located in the 200-OA-1 Operable Unit on the Hanford Site, DOE/RL-2011-101, Revision 0, US Department of Energy, September 2011

the firebreak roads. This resulted in the down-posting of more than 1,680 ac from Contamination Area or Soil Contamination Area postings to no radiological postings.

A number of suspect areas of contamination in Zone C, identified by the 2009 aerial survey, were investigated using field radiological instruments, which confirmed that these areas contained soil contamination at levels requiring radiological posting. No removal actions were performed in Zone C.

No DSA or hazard analysis of these posted areas has been conducted, but radiological surveys with the mobile survey systems demonstrate that excavation and soil removal eliminated the direct contact exposure pathway for cesium-137, thereby preventing future releases of radiological contamination from this site. Based on the decision to not perform any further removal actions in the BCCA at the current time, the author has used a Low to ND Risk rating across the site for a Facility Worker and ND for a Co-located Person and Public because there is no evidence that the remaining contamination is airborne or migrating to other areas.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

An interim ROD, ESD, and action memoranda are in place to remove contaminated soil, structures, and debris in the Central Plateau with disposal at ERDF. The range of cleanup alternatives mirrors what has been done to date across the UPR-200-E-83 waste site which include RTD contaminated soil sites to achieve RAOs comparable to 100 Areas; backfill, contour, and revegetate excavations; allow monitored natural attenuation to proceed for all sites with appropriate institutional controls; and if residual contamination remains after cleanup actions are completed, cleanup work will transition to LTS, including institutional controls and 5-year reviews of remedy effectiveness. Based on the current condition of the EU and safety record of previous excavation and removal of soils, the author has used a Low to ND Risk rating across the site for a Facility Worker and ND for a Co-located Person and Public during future remediation.

Groundwater, Vadose Zone, and Columbia River

There are no reported vadose zone inventories and thus no significant threats to the vadose zone, groundwater, or the Columbia River for the purposes of this Review.

Ecological Resources

Current

Current activities can impact high quality resources within the EU (59% of the resources are level 3 or greater) by disruption of nesting birds, perching birds, and introduction of exotic species.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

Because of the high resource value within the EU, any remediation activity (pedestrian and truck traffic, excavation, etc.) will potentially fragment and degrade the high level resources. Loss of biologically active soil will have long-term effects that impact revegetation and biological integrity of the region. Further disruption of the soil will impact the seed bank of high quality species. Construction activity and noise can disrupt loggerhead shrike and other sensitive wildlife. Construction of temporary buildings associated with cleanup will increase pedestrian, car and truck traffic on a daily basis. The EU and buffer area high value ecological resources are a large patch, not fragmented, and serves as a corridor for ecological resources in the Central Plateau (including elk migration).

Cultural Resources

Current

Known archaeological resources (that remain unevaluated for the National Register) are located within the EU. Several NHPA Section 106 reviews have been completed for the BC Control Zone.

Geomorphology indicates a moderate potential to contain intact archaeological resources on the surface and/or subsurface. Traditional cultural places are visible from EU. Known archaeological resources (that remain unevaluated for the National Register) are located within 500 meters of the EU.

One National Register eligible Manhattan Project and Cold War Era archaeological resource is located within the EU. Direct impacts to contributing components of the archaeological site have not been addressed and are dealt with on a project-by-project basis. Direct and indirect impacts may need to be considered to the seventeen Manhattan Project and Cold War Era archaeological resources that are located within the EU and within 500 meters of the EU. National Register eligible Manhattan Project/Cold War Era buildings located within 500 meters of the EU will be demolished, but they have already been mitigated.

Risks and Potential Impacts from Selected or Potential Cleanup Approaches

Archaeological investigations and monitoring may need to occur prior to remediation. The geomorphology indicates a moderate potential for intact archaeological resources. Remediation disturbance may result in impacts to archaeological resources if they are present in the subsurface. Temporary indirect effects to viewshed are possible during remediation. Permanent indirect effects to viewshed are possible from residual contamination that may remain.

Archaeological investigations and monitoring may need to occur prior to remediation. Direct and indirect effects to archaeological sites are possible during remediation and from any residual contamination that may remain. National Register eligible Manhattan Project/Cold War Era buildings located within 500 meters of the EU will be demolished, but they have already been mitigated.

Considerations for Timing of the Cleanup Actions

Radiological surveys with the mobile survey systems have demonstrated that excavation and soil removal eliminated the direct contact exposure pathway for cesium- 137, thereby preventing future releases of radiological contamination from this site. The remaining contamination is scattered across the BCCA in small hotspot locations that have been posted. There is no evidence that this remaining contamination is airborne or migrating to other areas. There does not appear to be any urgency to excavate these hot spots given the barren and inactive nature of this large land area.

Near-Term, Post-Cleanup Risks and Potential Impacts

Insufficient information available regarding the future cleanup strategy that will be used and its associated risks or impacts

PART II. ADMINISTRATIVE INFORMATION

OU AND/OR TSDF DESIGNATION(S)

200-UR- 1 OU

COMMON NAME(S) FOR EU

BC Controlled Area, BC Control Area, BCCA

KEY WORDS

BC Cribs & Trenches

REGULATORY STATUS:

Regulatory basis

CERCLA

Applicable regulatory documentation

DOE/RL-2007-51, Draft A, *Engineering Evaluation/Cost Analysis for the Northern Part of the BC Controlled Area (UPR-200-E-83)*

DOE/RL-2008-21, *Action Memorandum for the Non-Time-Critical Removal Action for the Northern Part of the BC Controlled Area (UPR-200-E-83)*

DOE/RL-2008-22, *Removal Action Work Plan for the Northern Part of the BC Controlled Area (UPR-200-E-83) Located Within the 200-UR-1 Operable Unit*

DOE/RL-2008-70, *Fiscal Year 2008 Interim Removal Action Report: BC Controlled Area (Waste Site UPR=200-E-83) Located in the 200-UR-1 Operable Unit on the Hanford Site*

Applicable Consent Decree or TPA milestones

M-015-00: Complete the RI/FS (or RFI/CMS and RI/FS) process for all non-tank farm operable units except for canyon/past practice waste site OUs covered in M-85-00. Due date June 30, 2026

M-016-00: Complete remedial actions for all non-tank farm and non-canyon operable units in accordance with schedules established in approved RD/RA work plans. Due date September 30, 2042

The schedule for completion of the construction of the remedy will reflect the scope and complexity of the selected remedial action. The schedule for remedial action implementation will be established upon regulatory agency approval of the RD/RA Work Plans and is enforceable as a HFFACO requirement.

RISK REVIEW EVALUATION INFORMATION

Completed

August 26, 2016, edited February 15, 2017

Evaluated by

Henry Mayer

Ratings/Impacts Reviewed by

Kathryn Higley and Kevin Brown

PART III. SUMMARY DESCRIPTION

CURRENT LAND USE

Industrial

DESIGNATED FUTURE LAND USE

Industrial

PRIMARY EU SOURCE COMPONENTS

Legacy Source Sites

The contamination in the BC Controlled Area (UPR-200-E-83) was the result of animal and plant (i.e., tumbleweed) intrusion and wind dispersion from the BC Cribs and Trenches. The BC Cribs and Trenches are separate waste sites and are discussed in the CP-LS-1 Evaluation Unit (Appendix G.5). The BC Cribs and Trenches were constructed in 1955 and received radioactive discharges of waste from two general sources: the uranium recovery project and 300 Area wastes, with the majority of the waste coming from the uranium recovery project.

The primary radionuclides found in the BC Controlled Area (BCCA) soils were cesium (Cs-137) and strontium (Sr-90), and to a lesser extent Plutonium (Pu-239/240). Sampling in 1999 showed that strontium surface soil concentrations range from 0.32 to 3420 pCi/g across the northern part of the BCCA. Cs-137 surface soil concentrations range from 0.35 to 2290 pCi/g across the area. Analytical data from calendar years 2005 and 2007 showed that the bulk of activity in areas with contamination caused by biological transport mechanisms (i.e., spread from animals) is primarily in the top 15 cm (6 in.) of the surface layer of soil, but is deeper in some areas. A 140-acre area designated as Zone A was identified as having the highest continuous radiological contamination over the 200-UR-1 OU radionuclide soil cleanup preliminary remediation goals (PRGs) and presenting the greatest risk to human health and the environment. Zone A is located directly south of the BC Cribs and Trenches area and is included in the CP-LS-1 (BC Cribs and Trenches) EU.

The 3,660-acre balance of the northern section of UPR-200-E-83 was designated as Zone B and was primarily contaminated by non-biological mechanisms (i.e., windblown plant and soil contamination). The radionuclides are believed to be in the top 2.5 cm (1 in.) of the surface layer of soil, with the exception of Sr-90, which is distributed about 15 cm (6 in.) deep, based on sample results. The top 2.5 cm (1 in.) layer is expected to contain about 40 percent of the strontium-90.

High-Level Waste Tanks and Ancillary Equipment

Not applicable

Groundwater Plumes

Not applicable

Operating Facilities

Not applicable

D&D of Inactive Facilities

Not applicable

LOCATION AND LAYOUT MAPS

The BC Controlled Area (CP-LS-17) is located south of the 200 East Area (in what is commonly called the 600 area) near the center of the Hanford Site and lies between Route 4S and the Army Loop Road. Route 4S is to the north and east of the BC Controlled Area, and the Columbia River is approximately 11.5 km (7 mi.) to the north-northeast of the BC Controlled Area.

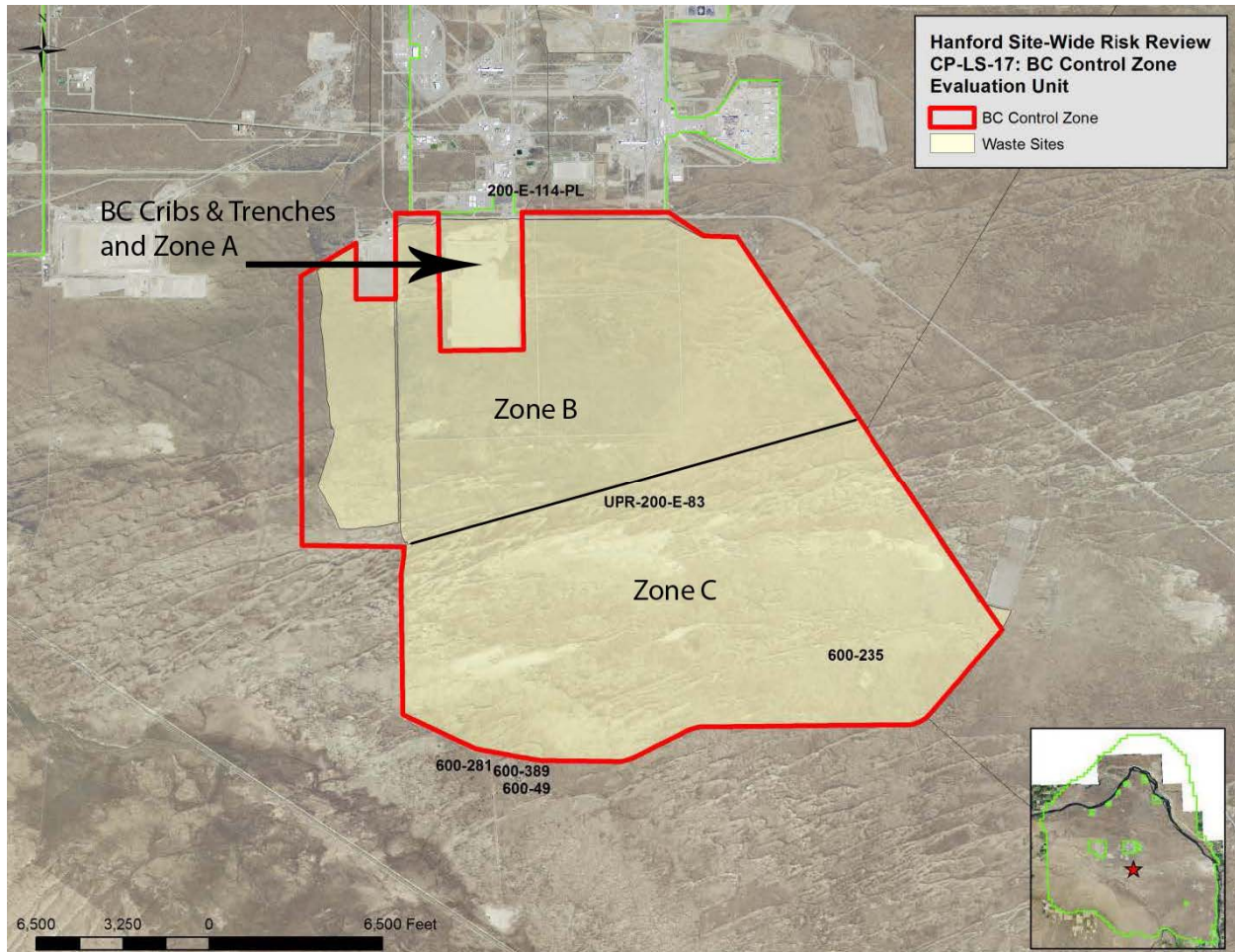


Figure G.11-1. Map of Evaluation Unit CP-LS-17 (PNNL, edited by H. Mayer)

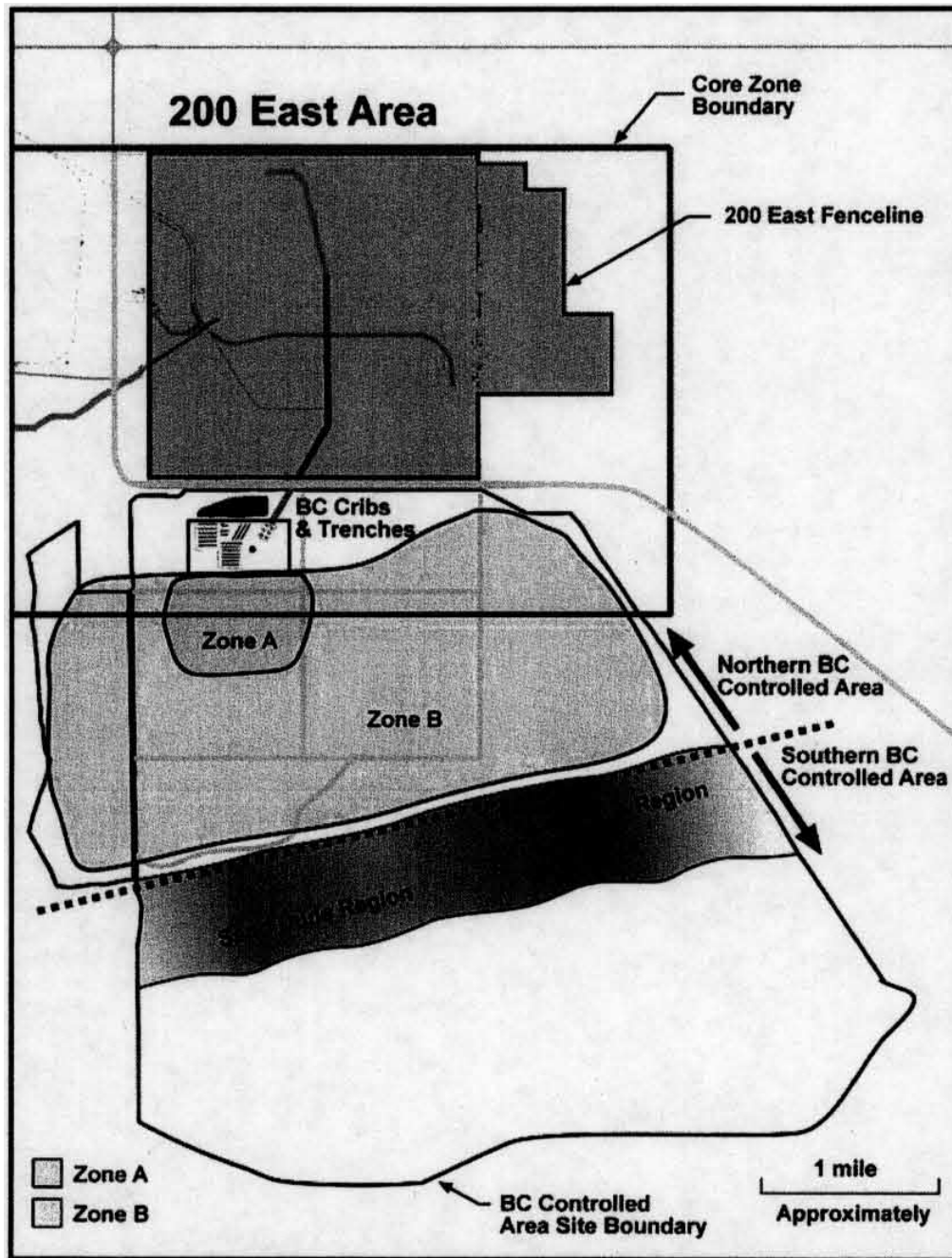


Figure G.11-2. Conceptual Diagram of the BC Controlled Area (DOE/RL-2007-51)

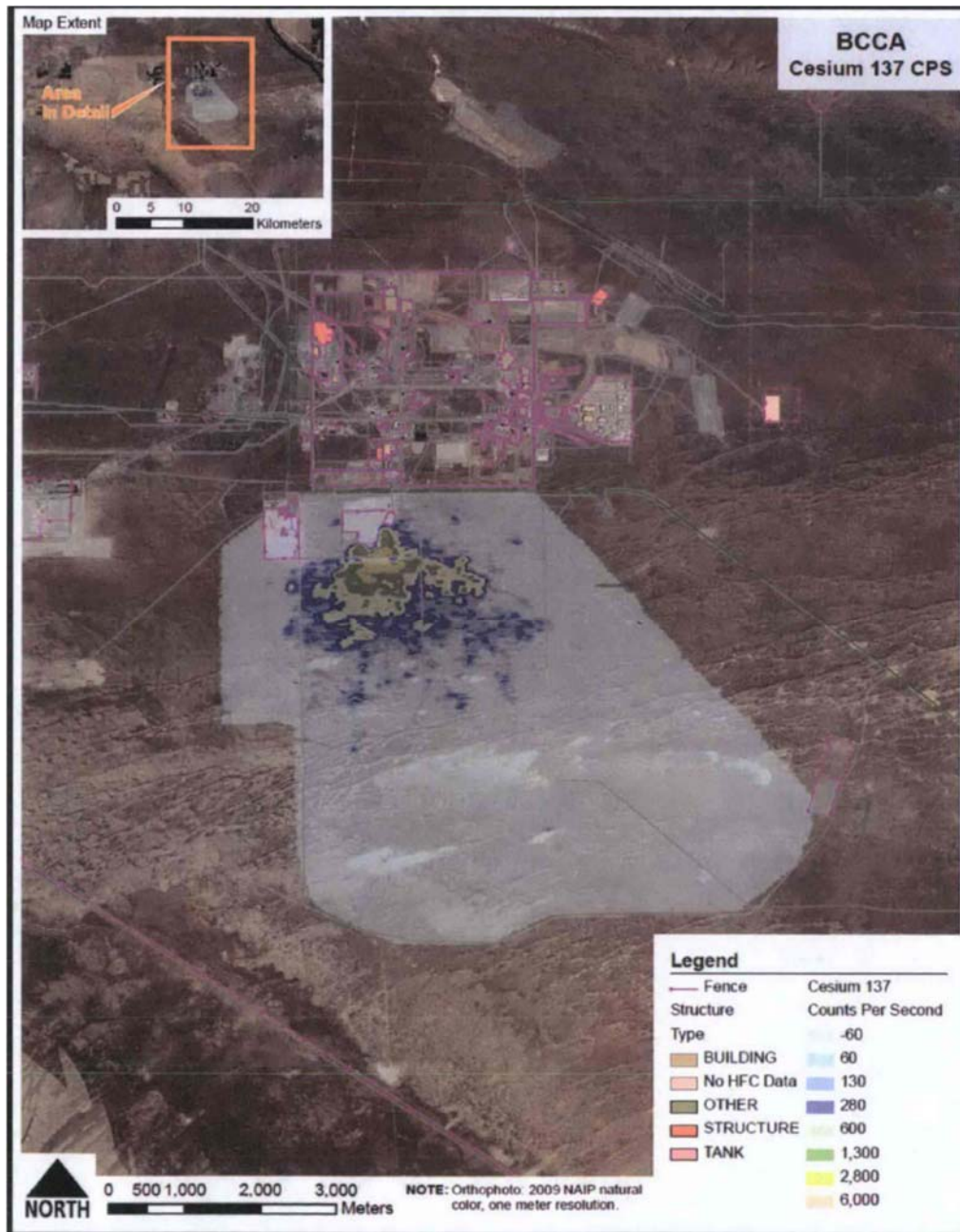


Figure G.11-3. 2009 Helicopter Survey Map Showing Nature and Extent of Cesium-137 Contamination

PART IV. UNIT DESCRIPTION AND HISTORY

EU FORMER/CURRENT USE(S)

LEGACY SOURCE SITES

The BC Controlled Area waste site (CP-LS-17) is part of the 200-UR-1 Unplanned Release Waste Group Operable Unit (OU) and is reported in the Hanford Waste Information Data Systems (WIDS) as an

unplanned release site (UPR-200-E-83). It is approximately 8,600 acres in size, of which about 140 acres is designated as Zone A and included in Evaluation Unit CP-LS-1 (BC Cribs and Trenches).

The contamination in the BC Controlled Area (UPR-200-E-83) was the result of animal intrusion and wind dispersion from the BC Cribs and Trenches. The BC Cribs and Trenches are separate waste sites and are discussed in the CP-LS-1 Evaluation Unit (Appendix G.5). The BC Cribs and Trenches were constructed in 1955 and received radioactive discharges of waste from two general sources: the uranium recovery project and 300 Area wastes, with the majority of the waste coming from the uranium recovery project.

During the period between the 1950s and 1960s, animal intrusions into the trenches occurred. In 1969, about 46,000m³ (60,000 yd³) of sand and gravel were used to cover and stabilize the BC Trenches thus stopping most of the remaining spread of contamination from these sources by animals. When the trenches were covered, it was identified that an adjacent area of about 10 km² (4 Mi²) was contaminated.

During 1972 to 1974, a program was implemented to study the distribution of the contamination and the mechanisms that could spread the contamination. This program included aerial gamma surveys of the BC Controlled Area, soil and in-situ exposure rate measurements, and a study of the physical and biological forces that could be spreading the contamination. The primary radionuclides found in the soil were cesium (Cs-137) and strontium (Sr-90). Animals, tumbleweeds, and strong winds were identified as the contributors to the spread of radionuclide contamination.

In August 1974, it was determined that there was no indication of undue risk to the public and employees from the BC cribs and trenches and, therefore, no immediate action was necessary to decontaminate the BC Controlled Area. However, by the late 1970s and early 1980s, stabilization measures of the BC cribs and trenches that had been taken in the 1960s had failed and contamination was spreading into the BC controlled area, primarily due to contaminated tumbleweed and animal intrusions. In 1982, additional stabilization was completed of the BC Cribs and Trenches area. Discoveries of contamination in the BC Controlled Area continued to occur after this stabilization.

Sampling in 1999 showed that strontium surface soil concentrations range from 0.32 to 3420 pCi/g across the northern part of the BC Controlled Area (BCCA). Cs-137 surface soil concentrations range from 0.35 to 2290 pCi/g across the area. The northern region of the BCCA is located north of the sand dunes that cross the controlled area from east to west. Analytical data from calendar years 2005 and 2007 showed that the bulk of activity in areas with contamination caused by biological transport mechanisms (i.e., spread from animals) is primarily in the top 15 cm (6 in.) of the surface layer of soil, but is deeper in some areas.

A final remedial decision for the 200-UR- 1 OU has not been made; however in 2008, CERCLA radioactive hazardous substances in the northern part of the BC Controlled Area were found to present a potential threat to human health and the environment to the extent that a removal action⁶ was warranted before a final remedial decision is documented. A 140-acre area designated as Zone A was identified as having the highest continuous radiological contamination over the PRGs and presenting the greatest risk to human health and the environment. Zone A is located directly south of the BC Cribs and Trenches area and is included in the CP-LS-1 (BC Cribs and Trenches) EU.

The 3,660-acre balance of the northern section of UPR-200-E-83 was designated as Zone B and was contaminated by non-biological mechanisms (i.e., windblown contamination). The radionuclides are

⁶ *Removal Action Work Plan for the Northern Part of the BC Controlled Area (UPR-200-E-83) Located Within the 200-UR-1 Operable Unit*, DOE/RL-2008-22, US Department of Energy, June 2008.

believed to be in the top 2.5 cm (1 in.) of the surface layer of soil, with the exception of Sr-90, which is distributed about 15 cm (6 in.) deep, based on sample results. The top 2.5 cm (1 in.) layer is expected to contain about 40 percent of the strontium-90.

Removal of the contaminated soils in Zone A began in 2008 and was completed in 2011. Approximately 483,000 tons of contaminated soil was removed and the area was revegetated with seed and about 280,000 pounds of mulch. A total of approximately 20,000 tons of contaminated soil was removed from the B Zone during the spring of 2010. This resulted in the removal of approximately 15 ac of contaminated spots. Because the original funding was limited to accomplishing the removal of 15 ac of contaminated soil, soil removal in Zone B was suspended after the completion of this scope. Contaminated spots have been investigated and accurately posted in the majority of the area outside the firebreak roads. This resulted in the down-posting of more than 1,680 ac from Contamination Area or Soil Contamination Area postings to no radiological postings.

GROUNDWATER PLUMES

Not applicable

D&D OF INACTIVE FACILITIES

Not applicable

ECOLOGICAL RESOURCES SETTING

Landscape Evaluation and Resource Classification

Nearly all of the area (8358.5 acres, 97.2%) within the BC Control Zone EU is classified as level 3 biological resources or above (Appendix J, Table J.40 and Figure J.42). Only one small area of bare/disturbed level 0 (23 acres) is found along the northern boundary and two sections of level 2 habitats (totaling 217 acres) are found in the north half of the EU. The level 4 resource area is considered essential habitat (DOE/RL-96-32 2013) and reflects the high-quality sagebrush-steppe community present there. The large level 5 area making up the south and east portion of the EU is considered irreplaceable habitat because it is a plant community and sand dune complex element occurrence (DOE/RL-96-32 2013).

The amount and proximity of biological resources surrounding the BC Control Zone EU were examined within the adjacent landscape buffer area, which extends 29,415 feet (8,966 m) from the geometric center of the EU (Appendix J, Table J.40). Because of the large size of the EU, the adjacent landscape buffer encompasses an extensive area (53,863.8 acres) and includes the entire 200 East Area, the east half of the 200 West Area, a portion of the Laser Interferometer Gravitational-Wave Observatory (LIGO) Hanford Observatory, and a portion of the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit of the Hanford Reach National Monument on the south side of State Highway 240. Approximately 6% of the combined total area (EU plus adjacent landscape buffer) consists of disturbed/industrial sites (level 0 and 1 biological resources), with most occurring within the 200 East and 200 West Areas, and 9.8% consists of level 2 resources. The majority (84.2%) of the total combined area is made up of level 3 biological resources or above (Appendix J., Figure J.42, Table J.40), with a significant portion (41.3% overall) consisting of level 5 resources alone. The proportion of level 3-5 resources lost from remediation actions in the EU would be approximately 13.7% (Appendix J, Table J. 40).

Field Survey

Encompassing a total of nearly 8,599 acres, the BC Control Zone EU is the single largest EU evaluated under this risk review. Most of the area within the EU boundary is classified as either a Radiological Contamination Area (CA) or a Radiological Surface Contamination Area (SCA), and as such, access is restricted and controlled. Pedestrian surveys within representative regions of the habitat were conducted by PNNL biologists between June 24 and 30, 2015. Because of constraints of time and the restrictions involved in performing active work within CAs/SCAs, only visual estimates (no transect measurements) of vegetation cover were taken.

The EU consists of relatively undisturbed and intact successional and climax shrub-steppe habitats. The level 4 area (Appendix J, Table J.40) in the northcentral portion of the EU (including visual survey areas CA1, CA2, CA3, and CA5) is characterized by approximately 23% canopy cover of mature big sagebrush (*Artemisia tridentata*), a native climax shrub, with a mixed understory of introduced and native grasses (Appendix J, Table J.39). The south and east portions of the EU (including visual survey areas SCA NE, SCA SE, and SCA West) have lower shrub cover due to the effects of fires; this area contains approximately 3% native successional shrubs with a mix of introduced and native grasses (Appendix J, Table J.40). This level 5 area (Appendix J, Table J.40) is classified as a plant community element occurrence by the Washington Natural Heritage Program and contains several sand dune complexes throughout. The following wildlife species of concern, or their sign, were observed in the EU: several sage sparrows (*Amphispiza belli*, a Washington State Candidate species) were observed perching and singing within the level 4 habitat area, several adult and juvenile loggerhead shrikes (*Lanius ludovicianus*, a Washington State Candidate species) were seen throughout the EU, scat and trails of black-tailed jackrabbits (*Lepus californicus*, a Washington State Candidate species) was noted in the level 4 habitat area, and diggings of American badger (*Taxidea taxus*, a Washington State Monitor species) were observed in the western end of the level 5 area. See the Field Data Records section in the EU description of Appendix J for the full lists of plant and animal species recorded during the pedestrian surveys.

CULTURAL RESOURCES SETTING

Most of the CP-LS-17, BC Control Zone EU has been inventoried for archaeological resources, with 22 archaeological sites/isolates identified and recorded within the EU boundary. While most of these resources are associated with the Manhattan Project/Cold War Era Landscape, the Native American Precontact and Ethnographic Landscape as well as the Pre-Hanford Early Settlers/Farming landscape are also represented. Only one of these resources has been evaluated for listing to the National Register of Historic place (1 historic road was determined not eligible). Remediation of the BC Control Zone has been addressed in several NHPA Section 106 Reviews, including: *Cultural Resources Review for Remediation of Zone A of the BC Control Area Waste Site UPR-200-E-83, Operable Unit 200-UR-1, at the 600 Area, Hanford Site (HCRC# 2008-600-006a)* (Kennedy 2008b), *Cultural Resource Review and Inventory for the BC Controlled Area Northern Zone on the U.S. Department of Energy, Hanford Site, Benton County, Washington (HCRC# 2008-600-006b)* (Sharpe 2009), and *Cultural Resource Review for the BC Controlled Area Southern Zone on the U.S. Department of Energy Hanford Site, Benton County, Washington (HCRC# 2010-600-020)* (Sharpe 2010b).

There are 8 archaeological sites/isolates recorded within 500 meters of the EU. All three landscapes are represented, with the Native American Precontact and Ethnographic Landscape accounting for 4 of these recorded resources. Of the 8 archaeological sites/isolates, two have been evaluated for listing on the National Register of Historic Places. Both date to the Manhattan Project/Cold War Era Landscape, with one determined eligible for listing in the National Register of Historic Places, and the other

determined eligible as a contributing property within the Manhattan Project and Cold War Era Historic District. Mitigation for contributing resources has been completed in accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE/RL-97-56) (DOE-RL 1998). In addition there are 5 National Register-eligible Manhattan Project and Cold War Era buildings located within 500 meters of the EU (2 recommended for individual documentation and 3 with no additional documentation required).

Mitigation for contributing buildings/structures has been completed as per the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE/RL-97-56) (DOE-RL 1998).

Historic Maps and aerial imagery indicate that the area was largely undeveloped, with most of the land owned by public entities. This suggests a low potential for the presence of archaeological resources associated with the Pre-Hanford Early Settlers/Farming Landscape. Geomorphology indicates a moderate potential for the presence of Native American Precontact and Ethnographic cultural resources to be present within the EU boundary, primarily in areas with Holocene deposits (which extend over large portions of the EU). These resources, if present, would likely be limited to areas of intact, undisturbed Holocene dune sand deposits. A review of recent aerial imagery of the area suggests that large portions of the EU remain relatively undisturbed. Aside from area roadways constructed for Hanford Site operations, surface disturbances within the EU appear to be related to historic land use associated with the Manhattan project/Cold War Era landscape. This suggests a high potential for resources associated with this landscape to be present within the EU as evidenced by the archaeological resources currently both within and adjacent to the EU boundary.

Because of the potential for intact archaeological deposits within large portions of the BC Control Zone EU, it may be appropriate to conduct surface and subsurface archaeological investigations in these areas prior to initiating 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 who may have an interest in the areas (e.g. East Benton Historical Society, Prosser Cemetery Association, Franklin County Historical Society, the Reach, and the B-Reactor Museum Association) may need to occur. Consultation with Hanford Tribes may also 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 primary radionuclides found in the BC Controlled Area (BCCA) soils were cesium (Cs-137) and strontium (Sr-90), and to a lesser extent Plutonium (Pu-239/240). Sampling in 1999 showed that strontium surface soil concentrations range from 0.32 to 3420 pCi/g across the northern part of the BCCA. Cs-137 surface soil concentrations range from 0.35 to 2290 pCi/g across the area. Analytical data from calendar years 2005 and 2007 showed that the bulk of activity in areas with contamination caused by biological transport mechanisms (i.e., spread from animals) is primarily in the top 15 cm (6 in.) of the surface layer of soil, but is deeper in some areas. A 140-acre area designated as Zone A was identified as having the highest continuous radiological contamination over the 200-UR-1 OU radionuclide soil cleanup preliminary remediation goals (PRGs) and presenting the greatest risk to human health and the

environment. Zone A is located directly south of the BC Cribs and Trenches area and is included in the CP-LS-1 (BC Cribs and Trenches) EU.

The 3,660-acre balance of the northern section of UPR-200-E-83 was designated as Zone B and was primarily contaminated by non-biological mechanisms (i.e., windblown plant and soil contamination). The radionuclides are believed to be in the top 2.5 cm (1 in.) of the surface layer of soil, with the exception of Sr-90, which is distributed about 15 cm (6 in.) deep, based on sample results. The top 2.5 cm (1 in.) layer is expected to contain about 40 percent of the strontium-90.

Vadose Zone Contamination

There are no reported inventories for CP-LS-17 and thus there is no reported vadose zone inventory to be evaluated.

Groundwater Plumes

Not applicable

Table G.11-2. Inventory of Primary Contaminants^(a) – No Information Available

WIDS	Description	Decay Date	Ref	Am-241 (Ci)	C-14 (Ci)	Cl-36 (Ci)	Co-60 (Ci)	Cs-137 (Ci)	Eu-152 (Ci)	Eu-154 (Ci)	H-3 (Ci)	I-129 (Ci)

a. NR = Not reported

Table G.11-3. Inventory of Primary Contaminants (cont)^(a) - No Information Available

WIDS	Description	Decay Date	Ref	Ni-59 (Ci)	Ni-63 (Ci)	Pu (total) (Ci)	Sr-90 (Ci)	Tc-99 (Ci)	U (total) (Ci)

a. NR = Not reported

Table G.11-4. Inventory of Primary Contaminants (cont)^(a) – No Information Available

WIDS	Description	Ref	CCl4 (kg)	CN (kg)	Cr (kg)	Cr-VI (kg)	Hg (kg)	NO3 (kg)	Pb (kg)	TBP (kg)	TCE (kg)	U (total) (kg)

a. NR = Not reported

Table G.11-5. 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	0.25	0	1.82	---	---	---	---	---	ND
I-129	A	1 pCi/L	0.25	0.2	1.82	---	---	---	---	---	ND
Sr-90	B	8 pCi/L	0.25	22	1.82	---	---	---	---	---	ND
Tc-99	A	900 pCi/L	0.25	0	1.82	---	---	---	---	---	ND
CCl ₄	A	5 µg/L	0.25	0	1.82	---	---	---	---	---	ND
Cr	B	100 µg/L	0.25	0	1.82	---	---	---	---	---	ND
Cr-VI	A	48 µg/L ^b	0.25	0	1.82	---	---	---	---	---	ND
TCE	B	5 µg/L	0.25	2	1.82	---	---	---	---	---	ND
U(tot)	B	30 µg/L	0.25	0.8	1.82	---	---	---	---	---	ND

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

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.

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?

The BCCA site is inactive and no hazard analysis has been prepared.

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

Not applicable

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

Not applicable

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

The contamination generally is believed to be bound to the soil. Most of the urine and feces was deposited before 1970 (prior to the trenches being covered in 1969) and the physical material has long since decayed and the contamination absorbed by the soil. Most of the plant matter was deposited before the stabilization in 1982, and it, too, has decayed and been absorbed by the soil.⁷

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

Insufficient information available

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

Potential airborne pathway, but site is inactive with no human activity

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

Insufficient information available

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

No

POPULATIONS AND RESOURCES CURRENTLY AT RISK OR POTENTIALLY IMPACTED

Facility Worker

Low to non-discernable risk to facility worker

⁷ *Historical Site Assessment of the Surface Radioactive Contamination of the BC Controlled Area*, WMP-18647, Revision 0, Fluor Hanford, May 2004.

Co-Located Person (CP)

ND

Public

ND

Groundwater and Columbia River

There are no reported vadose inventory information for the CP-LS-17 waste sites; thus there are no threats to groundwater or the Columbia River. The ratings for all Group A and B primary contaminants are *Not Discernible (ND)* (Table G.11-5).

Ecological Resources

Summary of Ecological Review:

- 97.2% of the EU consists of levels 3, 4, and 5 biological resources, with over half of the EU (58.8%) classified as level 5.
- Only 2.8% of the EU consists of levels 0, 1, or 2 biological resources.
- The level 3 area within the north half of the EU supports a mature climax shrub-steppe vegetation community.
- The level 5 area making up the south and east portion of the EU is classified as an element occurrence; it is centrally located among and contiguous with similar level 5 resources in the adjacent landscape.
- A loss of 13.7% of level 3-5 resources at the landscape scale associated with remediation would be significant, not only because of the proportion of high quality/valuable biological resources lost within the EU, but also due to the large size of the area involved and its connectivity to adjacent habitats.

Cultural Resources

The BC Control Zone EU is located in the 600 Area of the Hanford Site, just south of the 200 East Area. Most of the EU has been inventoried for cultural resources under, Plot 707SD (Unknown 1987), HCRC# 89-600-010 (Minthorn and Chatters 1990b), HCRC# 89-600-002 (Cadoret and Chatters 1989), HCRC# 90-200-017 (Gard and Chatters 1990), HCRC# 90-600-016 (Minthorn and Chatters 1990a), HCRC# 93-200-001 (Crist and Wright 1993), HCRC# 93-600-016 (Dawson 1993), HCRC# 93-600-005A (Myers and McIntree 1993), HCRC# 94-600-034 (Simmons 1994), HCRC# 95-600-012 (Crist & Nickens 1995), HCRC# 2008-600-006 (Kennedy 2008a), HCRC# 2008-600-006a (Kennedy 2008b), HCRC# 2008-600-006b (Sharpe 2009), HCRC# 2010-200-012 (Sharpe 2010a), HCRC# 2010-600-018 (Gutzeit et al. 2010), HCRC# 2010-600-020 (Sharpe 2010b), HCRC# 2012-600-031a (Gilmour et al.), HCRC# 2012-600-035c (Hay et al. 2013), HCRC# 2013-600-012a (Sheldon et al. 2014), HCRC# 2013-600-018 (Sexton et al. 2013), HCRC# 2014-600-017 (Fergusson 2014) and HCRC# 2014-600-019 (Mendez 2014), with a total of twenty-three archaeological resources identified. Remediation of the BC Control Zone has been addressed in several NHPA Section 106 Reviews, including: *Cultural Resources Review for Remediation of Zone A of the BC Control Area Waste Site UPR-200-E-83, Operable Unit 200-UR-1, at the 600 Area, Hanford Site (HCRC# 2008-600-006a)* (Kennedy 2008b), *Cultural Resource Review and Inventory for the BC Controlled Area Northern Zone on the U.S. Department of Energy, Hanford Site, Benton County, Washington (HCRC# 2008-600-006b)* (Sharpe 2009), and *Cultural Resource Review for the BC Controlled Area Southern Zone on the U.S. Department of Energy Hanford Site, Benton County, Washington (HCRC# 2010-600-020)* (Sharpe 2010b). Much of the EU remains relatively undisturbed, suggesting a high potential for intact

surface and subsurface archaeological resources. In addition, surface inventories of the CP-LS-17, BC Control Zone EU have shown a high potential for the presence of archaeological resources, with 22 archaeological sites/isolates identified and recorded within the EU boundary.

Archaeological sites, buildings and Traditional Cultural Properties (TCPs) located within the EU⁸

- Twenty-two archaeological sites/isolates have been recorded within the CP-LS-17, BC Control Zone EU. Three of these resources are associated with the Native American Precontact and Ethnographic Landscape (2 isolates and 1 site), 4 are associated with the Pre-Hanford Early Settlers/Farming landscape (4 sites), and 15 are associated with the Manhattan Project/Cold War Era Landscape (8 sites, 6 isolates and 1 historic road). Only 2 of these resources have been evaluated for listing to the National Register of Historic places. One of the Manhattan Project/Cold War Era Landscape period sites has been determined eligible for inclusion in the National Register of Historic Places and the 1 historic road associated with this same landscape has been determined not eligible. All of the remaining sites/isolates within the EU remain unevaluated. It should be noted that while none of the isolates have been evaluated for listing in the National Register of Historic Places, these resources are typically assumed not eligible.
- No buildings and/or Traditional Cultural Properties (TCPs) are currently known to exist within the EU.

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

- Eight archaeological sites/isolates have been recorded within 500 meters of the CP-LS-17, BC Control Zone EU. Four of these resources are associated with the Native American Precontact and Ethnographic Landscape (2 isolates and 2 sites), 2 are associated with the Pre-Hanford Early Settlers/Farming landscape (1 isolate and 1 site), and 2 are associated with the Manhattan Project/Cold War Era Landscape (1 site). The two Manhattan Project/Cold War Era Landscape era sites are the only resources that have been evaluated for listing on the National Register of Historic place. One has been determined eligible for listing in the National Register of Historic places, and the other has been determined eligible as a contributing property within the Manhattan Project and Cold War Era Historic District. This resource has been mitigated in accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE/RL-97-56) (DOE-RL 1998).
- There are 5 National Register-eligible Manhattan Project and Cold War Era buildings located within 500 meters of the EU (all 5 are contributing within the Manhattan Project and Cold War Era Historic District, 2 recommended for individual documentation and 3 with no additional documentation required). Mitigation for contributing buildings/structures has been completed in accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE/RL-97-56) (DOE-RL 1998) and buildings demolition is ongoing.

Appendix K, Table K.25, has more information about the five buildings that are National Register-eligible Manhattan Project and Cold War Era buildings located within 500 meters of the CP-LS-17, BC Control Zone EU.

Closest Recorded TCP

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

There are 2 recorded TCPs associated with the Native American Precontact and Ethnographic Landscape that are visible from the CP-LS-17, BC Control Zone EU.

CLEANUP APPROACHES AND END-STATE CONCEPTUAL MODEL

Selected or Potential Cleanup Approaches

A final remedial decision for the 200-UR- 1 OU has not been made, however an interim ROD, ESD, and action memoranda are in place to remove contaminated soil, structures, and debris in the Central Plateau with disposal at ERDF. The range of cleanup alternatives mirrors what has been done to date across the UPR-200-E-83 waste site which include RTD contaminated soil sites to achieve RAOs comparable to 100 Areas; backfill, contour, and revegetate excavations; allow monitored natural attenuation to proceed for all sites with appropriate institutional controls; and if residual contamination remains after cleanup actions are completed, cleanup work will transition to LTS, including institutional controls and 5-year reviews of remedy effectiveness.

Contaminant Inventory Remaining at the Conclusion of Planned Active Cleanup Period

Insufficient information available regarding final cleanup strategy and possible remaining contaminant inventories

Risks and Potential Impacts Associated with Cleanup

Based on the current condition of the EU and safety record of previous excavation and removal of soils, the author has used a Low to ND Risk rating across the site for a Facility Worker and ND for a Co-located Person and Public during future remediation.

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

Facility Worker

Based on the current condition of this EU and safety record of previous excavation and removal of soils, the author has used a Low to ND Risk rating across the site for a Facility Worker and ND for a Co-located Person and Public during future remediation.

Co-located Person

See above

Public

See above

Groundwater

Not applicable

Columbia River

Not applicable

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, use of heavy wide hoses,

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, dust suppression, 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). Heavy wide hoses may have semi-permanent effects from compaction or vegetation removal. 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. 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. 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.

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 contaminated soils, structures, 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. 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 not 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 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 do not recolonize or thrive.

ADDITIONAL RISKS AND POTENTIAL IMPACTS IF CLEANUP IS DELAYED

Radiological surveys with the mobile survey systems have demonstrated that excavation and soil removal eliminated the direct contact exposure pathway for cesium-137, thereby preventing future releases of radiological contamination from this site. The remaining contamination is scattered across the BCCA in small hotspot locations that have been posted. There is no evidence that this remaining contamination is airborne or migrating to other areas. There does not appear to be any urgency to excavate these hot spots given the barren and inactive nature of this large land area.

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

Insufficient information available regarding final cleanup strategy and possible remaining contaminant inventories

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

Insufficient information available regarding final cleanup strategy and possible remaining risks

Table G.11-6. Summary of Populations and Resources at Risk or Potentially Impacted after Cleanup.

Population or Resource		Risk/Impact Rating ^(a)	Comments
Human	Facility Worker	IS	
	Co-located Person	IS	
	Public	IS	
Environmental	Groundwater	<i>Not Discernible (ND)</i>	No reported inventories so no risks or potential impacts.
	Columbia River	<i>ND</i>	
	Ecological Resources ^(b)	Medium-High	Remediation options, which include soil removal, will disrupt the seed bank and the biologically active soil, and has the potential of hampering revegetation and natural succession from level 5 resources. Remediation will introduce exotic species and disrupt an already functioning ecosystem.
Social	Cultural Resources ^(b)	Native American Direct: Known Indirect: Known Historic Pre-Hanford Direct: Known Indirect: Known Manhattan/Cold War Direct: Known Indirect: Known	Permanent direct effects are possible if residual contamination remains after remediation. Permanent direct and indirect effects to archaeological sites are possible from remediation and any residual contamination that may remain.

- Insufficient Information (IS) to determine human health impacts.
- For both Ecological and Cultural Resources see Appendices J and K, respectively, for a complete description of Ecological Field Assessments and literature review for Cultural Resources. Ecological ratings are described in Table 4-11 of the Final Report.

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

Insufficient information available regarding final cleanup strategy and possible remaining contaminant inventories.

PART VII. SUPPLEMENTAL INFORMATION AND CONSIDERATIONS

Table G.11-7. CP-LS-17(BC Control Zone) Waste Site and Facility List

Site Code	Name, Aliases, Description	Feature Type	Site Status	ERS Classification	ERS Reclassification	Site Type	Site Type Category	Operable Unit	Exclude from Evaluation	Comments
UPR-200-E-83	UPR-200-E-83; Zone A, Zone B, Zone C; BC Controlled Area; BC Cribs Controlled Area; BCCA; UN-200-E-83; UN-216-E-11	Waste Site	Inactive	Accepted	None	Contamination Migration	Unplanned Release Surface/Near Surface	200-OA-1		
600-235	600-235; Buried Lead Sheathed Telephone Cables	Waste Site	Inactive	Accepted	Interim No Action	Dumping Area	Burial Ground	TBD		
600-281	600-281; Scattered Debris South of Army Loop Road	Waste Site	Inactive	Accepted	Interim Closed Out	Dumping Area	Burial Ground	200-OA-1		
600-389	600-389; Non-Operational Property Evaluation Zone 4, Surface Debris near 600-49	Waste Site	Inactive	Accepted	None	Dumping Area	Burial Ground	TBD		
600-49	600-49; H-42 Gun Site Building Foundations, Ammunition Storage and Small Arms Firing Range	Waste Site	Inactive	Accepted	Interim Closed Out	Foundation	Infrastructure Building	200-OA-1		
200-E-114-PL	200-E-114-PL; 216-BC-2805; 2805-E1, 2805-E2, 2805-E3 and 2805-E4; Pipeline from 216-BY-201 to 216-BC-201; Pipeline from 241-BY Tank Farm to 241-C Tank Farm and BC Cribs Trenches	Waste Site	Inactive	Accepted	None	Radioactive Process Sewer	Pipeline and associated valves, etc.	200-IS-1		
200-E-101	200-E-101; 200 East Deep Lysimeter Site	Waste Site	Inactive	Accepted	Rejected	Experiment/Test Site	Field Test Site	200-OA-1	X	Rejected
6607-2	6607-2; Gun Site H-42 Septic Tank	Waste Site	Inactive	Accepted	Rejected	Septic Tank	Septic System	Not Applicable	X	Septic System
666	CAISSON NO. 1 WATER MONITORING, 60 FT DEEP	Facility	ACTIVE			STRUCTURE	Field Test Site			
667	CAISSON NO. 2 WATER MONITORING, 60 FT DEEP	Facility	ACTIVE			STRUCTURE	Field Test Site			
668	200 EAST DEEP LYSIMETER	Facility	INACTIVE			STRUCTURE	Field Test Site			
MO580	MOBILE OFFICE ON ARMY LOOP RD	Facility	ACTIVE			BUILDING	Infrastructure Building		X	Mobile Office

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